# Investigating the motivations for non-suicidal self-injury and interpersonal conflict in individuals with and without borderline characteristics.

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**Statement**

I declare that this thesis is my own work and that, to the best of my knowledge and belief, it does not contain materials from published sources without proper acknowledgement, nor does it contain material which has been accepted for the award of any other higher degree or graduate diploma in any university.

Signed:

Date: ....20/02/2014.....

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## Abstract

The aim of the study was to explore the differences in the psychophysiological and subjective responses to non-suicidal self-injury (NSSI) and interpersonal conflict (IC) of individuals with and without Borderline Personality Disorder (BPD) characteristics. Specifically, this study aimed to provide further evidence for a potential self-stimulatory function of NSSI and to extend the findings to interpersonal relationships for those with BPD. A personalised staged guided imagery methodology was used to investigate processes at the time of NSSI and IC. Contrary to expectations, the results indicated that interpersonal conflict was generally associated with higher arousal and more distress for both groups. However, and not as expected, only the BPD group reported significantly higher tension during the incident stage of IC than during NSSI. This finding is consistent with prior reports that individuals with borderline personalities have increased emotional reactivity to interpersonal distress. In contrast, subjective responses to NSSI revealed a significant tension reduction following the self-injurious act. This tension reduction model was only significantly evident for the BPD group, therefore and as not expected, providing further support for the affect regulatory function of NSSI in adults with borderline characteristics.

*Keywords:* Non-suicidal self-injury, self-harm, interpersonal conflict, motivations, borderline personality disorder, psychophysiology

Borderline Personality Disorder (BPD) is a common Axis II mental disorder characterised in the Diagnostic and Statistical Manual of Mental Disorder (5th ed, DSM-5, American Psychiatric Association [APA], 2013) by a pervasive pattern of instability in affect regulation, interpersonal relationships, impulse control, and self-image (Lieb, Zanarini, Schmahl, Linehan, & Bohus, 2004; Sable, 1997). For a diagnosis of BPD to be made at least five of the nine diagnostic criteria must be met (DSM-V, American Psychiatric Association [APA], 2013). However, suicidal tendency or non-suicidal self-injury (NSSI) have been suggested to be the most useful indicators of a correct diagnosis (Leichsenring, Leibing, Kruse, New, & Leweke, 2011). Others have proposed that the combination of suicidal tendency or NSSI and unstable relationships is the best predictor of a diagnosis being made (Grilo et al., 2007).

**Characteristics of NSSI**

NSSI is becoming an increasingly pervasive problem, especially in adolescents and young adult populations (Kadison & DiGeronimo, 2004; Klonsky, 2007; Wester & Trepal, 2005). Also known as self-mutilation (e.g., Nock & Prinstein, 2005), deliberate self-injury (e.g., Klonsky, 2007) or deliberate self-harm (Gratz, 2003), it is typically defined as a direct and deliberate destruction of one's own body tissue without suicidal intent (Nock & Prinstein, 2005). Previous research has suggested that 6-7% of young Australians, aged 15-24 years, have self-injured in any 12 month period, while over 12% report having done so in their lifetime (De Leo & Heller, 2004). A more recent study (Australian Institute of Health and Welfare, 2013) showed that NSSI rates among young Australians have considerably increased over the years with new figures close to 10 % among 15-16 years old girls and 4% among boys. However, it is difficult to estimate the true prevalence of NSSI as

evidence has suggested that only 10% of young adults who engage in self-injurious behaviours will seek hospital treatment (De Leo & Heller, 2004). In the United States, incidence rates of NSSI have been suggested to be approximately 10 to 15% in the general population with around 5 to 10% of these people engaging in repetitive or recurring NSSI (Yates, 2004).

The most common forms of NSSI include skin cutting, scratching, head banging, hitting and skin burning (Klonsky, 2007). Interestingly, among the different types of NSSI, skin cutting appears to be the primary method most strongly associated with psychopathology (Andover, Pepper, Ryabchenko, Orrico, & Gibb, 2005). In contrast, behaviours associated with eating disorders and substance use (e.g., alcohol abuse, bingeing and purging) are not considered as self-injurious behaviours because the resulting tissue damage, in general, indirect.

Inconsistent results have been reported in terms of gender differences in NSSI. Although researchers have found higher prevalence of NSSI among women in both adolescent and adult populations (Laye-Gindhu & Schonert-Reichl, 2005; Yates, 2004), others have claimed that such statistics are not reliable (Whitlock, Eckenrode, & Silverman, 2006). The discrepancy in the literature may possibly have been influenced by the ways in which researchers have defined NSSI, sample characteristics, and type of diagnostic classification (e.g., BPD is more prevalent in women; Hosmer, 2009).

It is important to mention that, even though NSSI is listed as a symptom of BPD (DSM-5, APA, 2013), not every individual who engages in NSSI can be diagnosed with the disorder or present with Borderline personality disturbance (Klonsky & Olino, 2008). In particular, Klonsky and Olino (2008) found that NSSI was also significantly associated with depressive and anxiety symptoms in the

absence of indicators of the presence of an Axis II condition. Other studies have observed self-injurious behaviours in several adult psychiatric and neurological populations other than borderline groups (see Chapman, Gratz, & Brown, 2006 for a review).

**Motivations for NSSI**

There are many theoretical approaches that explain the aetiology of NSSI and direct treatment. Some of these approaches focus on processes associated with affect regulation, attachment, coping mechanisms, object-relations and neurobiological predispositions (Hosmer, 2009; Yates, 2004). In general, there is consensus that the motivations for NSSI are complex and the behaviour is a result of multiple factors (Kleindienst et al., 2008).

Affect regulation tends to be the most prevalent function of self-injury in patients with and without borderline characteristics. That is, NSSI is typically regarded as a strategy to control intense, overwhelming negative emotions such as anxiety, anger, loneliness, frustration, guilt and emptiness as well as feelings of dissociation (Klonsky & Muhlenkemp, 2007). Research has suggested that the underpinning of NSSI is to substitute one kind of pain for another by means of diversion from the original pain (Farber, 2000). This is consistent with other theories that have proposed that the automatic negative reinforcement function (e.g., to stop bad feelings) of NSSI may be related to poor emotion regulation skills (Hilt, Cha, & Nolen-Hoeksema, 2008). For example, Chapman et al., (2006) have proposed an Experiential Avoidance Model (EAM) of NSSI suggesting that individuals typically engage in NSSI to avoid unwanted emotional states. Specifically, according to the EAM, NSSI is maintained and strengthened through the process of escape conditioning. That is, after being exposed to an emotionally evocative event, the

person experiences an urge to escape from the aversive emotional arousal and engages in NSSI, which subsequently reduces or eliminates the negative emotional arousal, thus providing negative reinforcement for NSSI. In a vicious cycle, repeated negative reinforcement strengthens the relationship between unpleasant emotional state and NSSI, such that NSSI becomes an automatic escape response (Chapman et al., 2006). Nock and Prinstein (2004) suggested that NSSI not only is associated with a process of negative reinforcement but also a process of automatic positive reinforcement, in which individuals engage in NSSI to achieve desired physiological states such as "to feel something even if it is pain" when experiencing a lack of feelings (e.g., dissociation). These functional models of NSSI are consistent with that of affect regulation in that distress is typically reduced after the act of self-injury.

Studies have found evidence of a tension-reduction process associated with self-injury as shown by a shift from high arousal to low arousal, immediately following NSSI (Brain, Haines, & Williams, 1998, 2002; Haines, Williams, Brain, & Wilson, 1995). Using guided imagery to recreate a memory of an episode of NSSI and measuring individuals' reactions to that memory, Haines and colleagues (1995) demonstrated reductions in psychophysiological arousal (i.e., heart rate) and negative psychological responses (i.e., distress) during and after imaging of self-cutting. Schasse, Von der Heyde, and Huether (2002) used ambulatory monitoring methods to investigate nocturnal cortisol levels, subjective emotional experiences and incidents of NSSI over an 86 days period in a woman actively engaging in NSSI. Their results showed that high cortisol levels were associated with high ratings of negative emotions and preceded episodes of NSSI. However, following NSSI, cortisol levels reduced dramatically and remained low for the next few days (Schasse

et al., 2002). Patterns of tension reduction during and following the act of NSSI have also been found in other studies (e.g., Kleindienst et al., 2008).

Nevertheless, it is interesting to note that some researchers do not solely identify affect regulation as a change from distress to calm. In fact, other motives for NSSI such as mood enhancement and excitement among individuals with BPD have been suggested. In a study of motivations for NSSI (Kleindienst et al., 2008), a structured self-rating questionnaire was administered to 101 female patients with a diagnosis of BPD. The results showed that most patients reported multiple motives for NSSI with negative reinforcement almost always involved in NSSI. Interestingly, Kleindienst et al. (2008) also reported that, contrary to the tension reduction model put forward in other studies, half of their patients reported "getting a kick" out of NSSI, suggesting an arousal increase with the act of self-injury.

Similar results were found in another study looking at both individuals with and without (NBPD) borderline characteristics and NSSI (Bowe, 2010). In this study, both the BPD and NBPD groups reported similar psychological reactions after engaging in self-cutting. That is, they reported to feel better after the self-injurious act. Interestingly, although the results from the non-borderline participants showed a tension reduction from high arousal to low arousal immediately after NSSI, the results for the borderline participants demonstrated an increase in heart rate from a low level immediately before cutting to a high level during and immediately after self-cutting. It may be the case that self-injury serve a self-stimulatory function rather than a tension reduction function for people with BPD (Bowe, 2010). Therefore, the function may still be one of affect regulation but the direction of change as a result of self-injury may be different for people with and without BPD.

**Borderline Personality Characteristics**

To understand such fundamental differences in the function of self-injury for Borderline individuals, it is necessary to consider the broader context of Borderline characteristics. These individuals tend to be impulsive, have unstable moods and intense tumultuous interpersonal relationships characterised by repeated breakups, frequent arguments and reliance on maladaptive strategies that can both anger and frighten others (e.g., highly emotional or unpredictable responses; Koenigsberg et al., 2001; Lieb et al., 2004). Literature is yet to establish whether or not such interpersonal difficulties have a similar underlying function as NSSI in individuals with Borderline Personality Disorder. That is, it has not been determined whether engaging in interpersonal conflict and NSSI may both be related to affect regulatory processes of a similar nature.

Linehan (1993) has suggested that affective instability plays a central role in producing the characteristic behavioural and interpersonal disturbances of BPD. According to Linehan's (1993) biosocial model, BPD is primarily a disorder of emotion dysregulation and develops through interactions between individuals' vulnerabilities (i.e., emotional sensitivity and reactivity) and invalidating interpersonal environmental. As a consequence, people with BPD have a) a high emotional vulnerability, b) an inability to regulate emotions, and c) a slow return to emotional baseline (Crowell, Beauchaine, & Linehan, 2009). Koenigsberg and colleagues (2001) have suggested that turbulent interpersonal relationships characteristic of BPD are not only due to affective instability but also due to an inability to control aggressive impulses. This is consistent with other researchers (Crowell et al., 2009) who proposed that impulsivity was among the earliest emerging traits of those diagnosed with BPD and that, more specifically, early

impulsivity was a predisposing factor for both current and future difficulties with emotion regulation, a position that Linehan (1993) did not consider in her original biological model (Crowell et al.2009).

Stanley and Siever (2010) have argued that although poor affect regulation and impulsive aggression are at the core of the disorder, it is the interpersonal sensitivity of individuals with BPD that often triggers both dysregulated affect and impulsive behaviours. Therefore, these authors that this sensitivity may rest at the core of the disorder and, in turn, drive the dysregulated affect and impulsive aggression (Stanley & Siever, 2010) found in BPD. Research has suggested that the interpersonal difficulties of BPD appear to be responsible for much of the distress these individuals experience in daily life. In particular, loneliness, perceived rejection and abandonment as well as disruptions in relationships have been identified as precipitants for substance abuse, suicide attempts and NSSI (Brodsky, Groves, Oquendo, Mann, & Stanley, 2006; Shaw-Welch & Linehan, 2002).

The affective instability displayed by individuals with BPD may be caused by a marked reactivity of mood (e.g., intense episodic dysphoria, irritability, anger usually lasting a few hours and rarely more than a few days; APA, 2013). The basic dysphoric mood, common in BPD, is often interrupted by periods of panic, despair or anger and is rarely alleviated by feelings of well-being and satisfaction (APA, 2013). These episodes have been suggested to reflect the extreme reactivity to interpersonal stresses for people with borderline disturbance (APA, 2013).

Attachment theory is believed to be at the core of these extreme reactivities to interpersonal stresses. Specifically, theorists have proposed that histories of disrupted attachment relationships are frequent in individuals with BPD (see Hosmer, 2009 for a review). Typically, healthy individuals develop a sense of well-

being and self-esteem in the context of soothing and nurturing relationships over the course of their development. This sense of well-being and self-esteem depends on both interpersonal environment and the ability to internally adopt these soothing relationships (Stanley & Siever, 2010). Therefore, it makes sense that dysfunctional attachment patterns from early childhood would contribute to the identity disturbance (i.e., markedly and persistently unstable self-image or sense of self; APA, 2013) frequently found in individuals with BPD. Stanley and Siever (2010) have argued that individuals with borderline characteristics appear to maintain their sense of self-integrity based on the availability of important others. Therefore, it is not surprising that individuals with BPD would engage in frantic efforts to avoid real or imagined abandonment.

Individuals with BPD also often complain about chronic feeling of emptiness and boredom (Kaplan & Sadock, 2007). A recent multi-method investigation (Suvak, 2010) of affective dysfunction in BPD examined how information regarding arousal (i.e., calm-activated) and emotional valence (i.e., pleasant-unpleasant) was incorporated in the individuals' representations of emotions (i.e., physiological responding, conceptual representations of emotions and use of emotion terms). Forty-six participants diagnosed with BPD and 51 controls not endorsing significant BPD symptoms or any Axis I pathology viewed emotionally evocative images while a variety of psychophysiological measures (e.g., eye blink startle response, heart rate, skin conductance and facial muscle activity) were recorded. Interestingly, the results showed that borderline individuals had lower threshold for responding to increased arousal levels in an unpleasant manner and emphasised arousal to a lesser degree than NBPD people. Therefore, it may also be a possibility that the emotional lability and interpersonal difficulties of individuals with borderline symptoms, although

somewhat distressing, are also experienced as fundamentally rewarding because of the drama and excitement associated with such conflicts. In other terms, individuals with borderline characteristics might need that extra 'stimulus' to achieve higher level of arousal and subsequent positive emotional state.

**Aims and hypotheses of the current study**

The aim of the proposed study is to replicate and extend Bowe's (2010) findings by comparing the responses to NSSI and interpersonal conflicts (IC) of people with and without BPD. Insight into the direction of the affect regulation process in people with BPD may have important implications for the management and treatment needs of this specific clinical group. It is possible that a need for stimulation influences many of the seemingly diverse aspects of borderline characteristics.

Using a personalised, staged guided imagery methodology, the primary research objective is to investigate whether the response to interpersonal conflict in borderline and non-borderline populations matches the response to NSSI in terms of the direction of the affect regulation process. Specifically, it is assumed that BPD and NBPD individuals will show opposite patterns of affect regulation. That is, it expected that the NBPD group will experience reduced heart rate with the act of NSSI in conjunction with a shift from high arousal, negative psychological response (e.g., distress) to low arousal, positive psychological response (e.g., calm/relief). It is also hypothesised that interpersonal conflicts will result in increased heart rate and a move towards increasingly high arousal, negative psychological state (e.g., distress) for the NBPD group. In contrast, it is predicted that borderline participants will demonstrate increased heart rates at times of self-injury and interpersonal conflicts, in conjunction with a shift from a low arousal, negative emotional state immediately

before the two target events to a high arousal, positive emotional state immediately after. Furthermore, concordant with the tension-reduction theory, responses to emotionally neutral events (e.g., making a cup of coffee) are expected to elicit low levels of arousal and no indication of negative emotional state with no variation across the stages of imagery for both the NBPD and BPD groups.

**Design of the study**

A 2 [Group: BPD, NBPD] x 3 (Script: NSSI, IC, Neutral) x 4 (Stage: scene, approach, incident, consequence) mixed factorial design with repeated measures was used. Dependent variables included heart rate and the psychological responses to visual analogue scales.

## Method

**Participants**

All participants (N = 19) were recruited through advertisement on the University of Tasmania School of Psychology website and through flyers posted around campus. Previous research (Haines et al., 1995) has shown that, when using personalised imagery, the memory of the actual event is necessary to produce psychophysiological changes. Therefore, only participants with a reported history of NSSI were invited to participate in the study. Group allocation (BPD vs NBPD) was confirmed using the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II; First, Gibbon, Spitzer, Williams, & Benjamin, 1997). Written consent was obtained before commencing the study (see Appendix A for a copy of the participants' information sheet and consent form). Approval for the study was granted by the Human Research Ethics Committee (Tasmania) Network.

## Materials

### Clinical Interview.

#### *Demographic questionnaire.*

A demographic questionnaire was developed to obtain information about the participants' characteristics (e.g., age, gender, marital status, education level) as well as to gather information specifically related to NSSI (e.g., frequency, duration, nature of NSSI and motivations) and interpersonal conflicts (e.g., frequency, duration, feelings associated with IC). A copy of the demographic questionnaire is presented in Appendix B.

#### *SCID-II.*

The Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II, First, Gibbon, Spitzer, Williams, & Benjamin, 1997) is a semi-structured diagnostic interview assessing the ten DSM-IV (APA, 2000) Axis II personality disorders. The SCID-II can be used to make personality disorder diagnoses, either categorically (present or absent) or dimensionally (by scoring the number of personality disorder criteria for each diagnosis that are coded "3"; First et al., 1997). The SCID-II has been used in both research and clinical settings (e.g. Asnaani, Chelminski, Young, & Zimmerman, 2007; Bowe, 2010; Lau, 2012). For the purpose of the study only the section related to Borderline Personality Disorder was administered. Allocation was made based on the participants' responses to the criteria for Borderline Personality disorder (i.e., unstable relationships, impulsivity, labile affect, anger, suicidality, instability in identity, dissociation and transient psychotic symptoms, emptiness and fear of abandonment). Five or more scores of "3" (threshold or true) were required for a diagnosis of Borderline Personality. The SCID-II has demonstrated good psychometric properties in both research and clinical

settings (e.g., Farmer & Chapman, 2002; Maffei et al., 1997). The SCID-II was not updated to DSM-5 (APA, 2013) at time of writing.

**Psychophysiological Testing.**

Personalised imagery scripts were developed based on the information provided by each participant regarding an episode of NSSI, an experience of interpersonal conflict and an emotionally neutral event such as making a cup of coffee. Each script consisted of four stages: setting the scene (describing the situation in which the event occurred and the precipitants), the approach (the moments before the targeted behaviour), the incident (the actual targeted behaviour) and the consequence (the moments immediately after the targeted behaviour). Examples of imagery scripts are presented in Appendix C.

Visual analogue scales (VASs, McCormack, Horne, & Sheater, 1988), rated from 0 to 100, were used to assess the psychological responses to these events. Psychological responses included anger, unhappiness, tension, anxiety, agitation, relief, boredom, calmness, pleasure, arousal and excitement. Two additional scales were used to control for image clarity and accuracy of script content. A copy of the VASs can be found in Appendix D.

Equipment including a PC computer connected to a PowerLab/8S Data Acquisition system using Chart software was used for the psychophysiological recordings. Recordings were made at 1mm/s with a sampling speed of 200 samples/s. Heart rate data was recorded using 7mm Ag/AgCI electrodes, one placed on each side of the torso along the lateral line with an earth on the mastoid process.

**Procedure**

The study involved two sessions that took place in a research laboratory in the School of Psychology. In a preliminary session, demographic information about

the participants was gathered and the SCID-II (First et al., 1997) was administered. Participants were also interviewed about the three target events during this session. Recollection of past self-injurious behaviours and interpersonal conflicts focused on either the most recent episode or the most vividly recalled episode. Individuals were requested to describe all three events in terms of their environment, their behaviours and their emotional and physical reactions. The information gathered during the interview was time limited to moments just before the incident, moments during the actual incident as well as moments just after the incident occurred. This was done in order to develop imagery scripts that could provide a continuous sequence of events.

Participants were then asked to attend a secondary session, during which the three imagery scripts were verbally administrated in a counterbalanced order and psychophysiological measurements recorded. Each step of the process was explained to the participants before it occurred. Participants were told that the information collected during their interview had been divided into four stages for each event recollected and that each stage would last approximately one minute. They were asked to listen carefully to the information presented, and to picture the scenes as clearly as possible. A baseline measure of 60 seconds was taken before commencing each script. Each stage lasted approximately 60 seconds with a brief pause (10 seconds) in between each stage, during which participants were instructed to open their eyes and withdraw from the imagery. After completion of each script, individuals were asked to rate their subjective experience by completing the VASs for each stage of each script. Reminders were given after each script content. Debriefing about the study was given after the individual's data collection.

### Data scoring and Statistical Analyses

Scores were extracted for a 30 second period of each stage of each script. As each script was personalised, the 30 second period was selected based on the part of each stage containing the most relevant information for that individual. Typically, this period occurred approximately 15-20 seconds into each stage. This method of scoring has been used successfully in other studies (Brain et al., 1998; Haines et al., 1995).

Scores were analysed using the IBM Statistical Package for Social Sciences (SPSS), version 21.0. A 2 (group) x 3 (script) x 4 (stage) analysis of variance (ANOVA) with repeated measures was used to test the differences in psychophysiological and psychological responses to the three scripts among both groups. One way repeated measures ANOVAs were used to test significant main effects between the dependent variables. Independent sample t-tests and the Chi square test for goodness of fit were performed to compare the means between the two groups for the continuous and categorical variables respectively. A significance criterion of .05 was used for all analyses, and a Hyunh-Feldt correction was applied to the ANOVAs when the sphericity assumption was violated. Post-hoc analyses using Fisher's Least of Significance Difference (LSD) test was used for all significant interactions.

## Results

### Descriptive Statistics

Descriptive characteristics for both the BPD and NBPD groups are presented in Table 1. There were no statistical deviations from expected frequencies or group differences for sex, age, marital status or education level. As expected, there was a

significant group difference for the SCID-II scores with the BPD group obtaining a higher score than the NBPD group.

Table 1

*Descriptive characteristics of Borderline and Non-Borderline participants*

| Variable | Level | | Group | | Post hoc anal. |
|---|---|---|---|---|---|
| | | | BPD | NBPD | |
| Sex | Female | % | 78 | 60 | $\chi^2$ (1,N=19)= .7, $p$=.405 |
| Age | | M | 21 | 29 | $t$ (10,17)= -1.5, $p$ =.160 |
| | | SD | 4 | 16 | |
| SCID-II score[1] | | M | 7.6 | 2.6 | $t$ (17)= 9.0, $p$<.001 |
| | | SD | 1.3 | 1.1 | |
| Marital status | Single | % | 78 | 80 | $\chi^2$ (2,N=19)=1.4, $p$=.509 |
| | Married/De facto | | 22 | 10 | |
| | Sep/divorce | | 0 | 10 | |
| Education level | University | % | 0 | 10 | $\chi^2$ (3,N=19)=2.7, $p$=.438 |
| | TAFE | | 44 | 20 | |
| | Year 12 | | 56 | 60 | |
| | Secondary | | 0 | 10 | |

[1] Structured Clinical Interview for DSM-IV Axis II Disorders, scores relate to the number of items coded "3".

**Descriptive characteristics specific to NSSI and IC.**

Consideration was given to potential differences between the BPD and NBPD groups in terms of nature, frequency and duration of NSSI, as well as frequency and duration of interpersonal conflicts. These results are presented in Table 2. No significant differences between the two groups were found for any of these factors. In general, skin cutting was identified as the primary method for NSSI among the two groups and most participants had engaged in NSSI in the last month prior to the interview. The largest percentage of participants across the two groups had self-injured less than 50 times over a period of years. Although, a small percentage of participants from both groups had reported their last NSSI episode more than a year before data collection, the majority of both groups had self-injured within the last 12 months. Brain, Haines and Williams (1998) found evidence to suggest that individuals with a reported history of NSSI remained vulnerable to re-activating the behaviour even after considerable periods of time. In terms of IC, most participants reported their last event within a month prior to the interview with a frequency of monthly arguments.

Table 2

*Descriptive factors associated with NSSI and IC for the BPD and NBPD groups*

| Variable | Level | | Group | | Post hoc anal. |
|---|---|---|---|---|---|
| | | | BPD | NBPD | |
| Nature of NSSI[1] | Skin Cutting | % | 78 | 60 | $\chi^2$ (2,N=19)=1.0,$p$ = .598 |
| | Skin Picking | | 11 | 30 | |
| | Head Banging | | 11 | 10 | |
| Freq. of NSSI | Daily | % | 0 | 30 | $\chi^2$ (4,N=19)=5.1,$p$ = .277 |
| | Weekly | | 34 | 10 | |
| | Fortnightly | | 11 | 0 | |
| | Monthly | | 33 | 40 | |
| | Yearly | | 22 | 20 | |
| Last NSSI event | Last month | % | 56 | 40 | $\chi^2$ (3,N=19)= .6,$p$ = .898 |
| | Last 6 months | | 11 | 20 | |
| | Last Year | | 10 | 10 | |
| | > 1 year | | 23 | 30 | |
| No. of injuries | < 5 | % | 0 | 0 | $\chi^2$ (2,N=19)= .2,$p$ = .929 |
| | < 50 | | 45 | 40 | |
| | <100 | | 33 | 30 | |
| | >500 | | 22 | 30 | |
| Sought Ψ help? | Yes | % | 67 | 40 | $\chi^2$ (1,N= 19)=1.4,$p$= .245 |
| Freq. of IC | Daily | % | 0 | 0 | $\chi^2$ (3,N=19)= 5.3,$p$= .151 |
| | Weekly | | 22 | 10 | |
| | Fortnightly | | 11 | 30 | |

| | | | | | |
|---|---|---|---|---|---|
| | Monthly | | 67 | 30 | |
| | Yearly | | 0 | 30 | |
| Last IC event | Last month | % | 78 | 50 | $\chi^2(2,N=19)=2.0, p = .377$ |
| | Last 6 months | | 22 | 40 | |
| | Last Year | | 0 | 0 | |
| | > 1 year | | 0 | 10 | |

[1] Primary method of NSSI

## Response to Imagery – Heart rate

### Group x script x stage interaction.

No significant group by script by stage interaction was found for the heart rate scores, $F$ (3.3, 57.7) = 1.09, $p$ = .364. The results for the BPD and NBPD groups are presented in Figure 1 below (see Appendix E for a table of means and standard deviations).

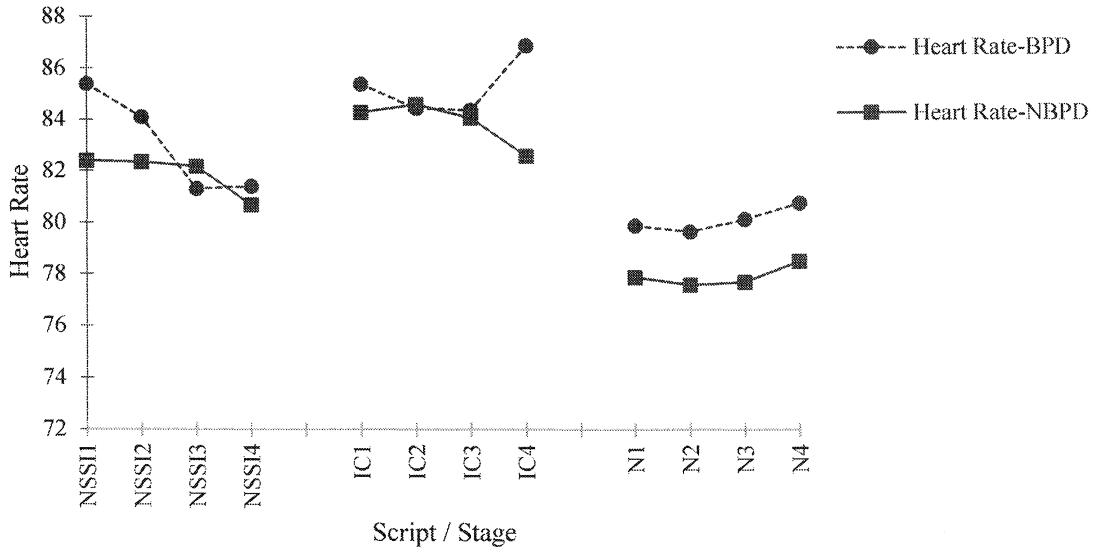



*Figure 1.* Mean heart rates for each stage of each script for the BPD and NBPD groups.

**Main Effect Analyses.**

The analysis revealed a significant main effect for script, $F$ (2, 33.5) = 21.77, $p < .001$, $\eta^2_p = .562$. Heart rate scores were higher in response to the IC script, $M$ = 84.59, $SE$ = 2.07, 95% CI [80.21, 88.96] than in response to the NSSI script, $M$ = 82.48, $SE$ = 2.21, 95% CI [77.81, 87.15], and the Neutral event, $M$ = 79.01, $SE$ = 2.01, 95% CI [74.78, 83.24]. Post hoc pairwise comparisons using Fisher's LSD test showed that heart rate for IC was significantly higher than that for the other two scripts. Similarly, heart rate was significantly higher in response to NSSI than the Neutral event.

**Response to Imagery – Visual Analogue Scales**

**Group x script x stage interaction.**

A significant group by script by stage interaction was only found for Tension, $F$ (6, 102) = 2.56, $p$ = .024, $\eta^2_p$ = .131. The results are presented in Figure 2 below (see Appendix F for tables of means and standard deviations).

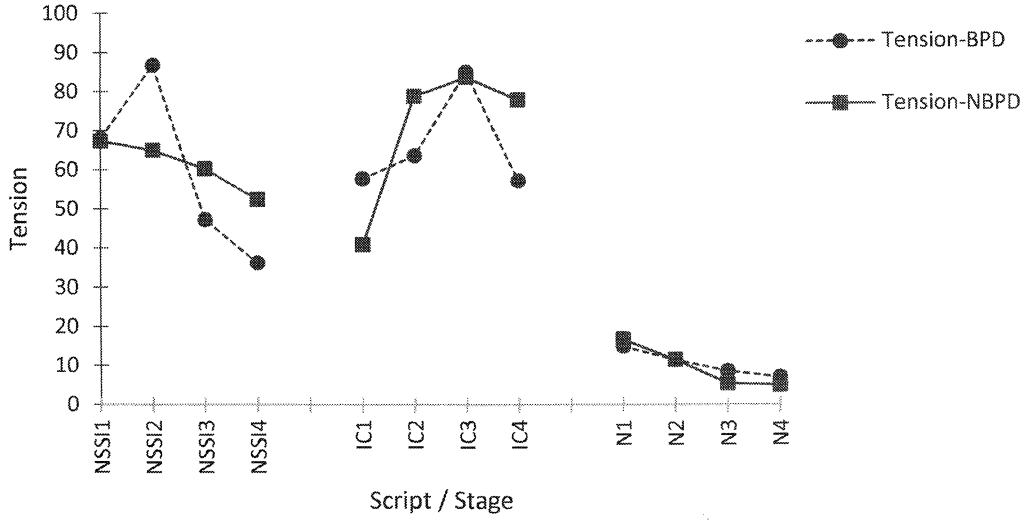



*Figure 2*. Mean tension ratings across stages for each script for both groups

Group comparisons at each stage of each script did not produce significant results (see Appendix F). However, the significant script x stage x group interaction

suggests that the relationship between the three scripts and across stages is different for the two groups. Therefore, examination was made of the script x stage interactions for each group separately.

**Tension response - BPD group.**

***Script differences at each stage.***

ANOVAs performed on the tension data within the BPD group showed significant differences across scripts for all stages of the imagery. Specifically, ratings of tension were significantly higher during the NSSI and IC scripts than during the Neutral script across all stages. Significant differences between the NSSI and IC scripts were only found for the Incident stage with participants reporting higher levels of tension after the Incident stage of IC than that of NSSI. The results are presented in Table 3.

Table 3

*Tension ratings: Means, Standard Deviations and Post Hoc Analysis Results for Script Differences at each Stage for the BPD group*

| | | Script | | | | | |
|---|---|---|---|---|---|---|---|
| Variable | Stage | NSSI | IC | N | df | F | $\eta^2_p$ |
| Tension BPD | Scene | $68.00_a$ (30.57) | $57.78_{ab}$ (27.23) | $15.00_c$ (14.03) | 2, 16 | $14.30^{***}$ | .812 |
| | Approach | $86.89_a$ (13.79) | $63.67_{ab}$ (37.35) | $11.44_c$ (7.80) | 2, 16 | $27.69^{***}$ | .763 |
| | Incident | $47.33_a$ (28.50) | $85.11_b$ (10.11) | $8.56_c$ (7.44) | 1.4, 11.1 | $39.62^{***}$ | .832 |
| | Conseq | $36.22_a$ (34.67) | $57.33_{ab}$ (31.21) | $7.00_c$ (6.56) | 2, 16 | $9.70^{**}$ | .548 |

Note. N = 19, $^{**}p$ <.01, $^{***}p$ <.001. Standard deviations appear in parentheses below means. Means within rows with differing subscripts are significantly different at least at the $p < .05$ level using Fisher's LSD test (i.e. Mean $_a$ differ significantly from Mean $_b$ ; Mean $_{ab}$ does not differ significantly from Mean $_a$ andMean $_b$).

***Across stage change for each script.***

For the BPD group, tension ratings differed significantly across stages for the NSSI script, $F$ (1.9, 15.4) = 6.75, $p$ = .008, $\eta^2_p$ = .458 but only trends toward

significance were found for the IC, $F$ (3, 24) = 2.56, $p$ = .079 and Neutral, $F$ (1.9, 15.8) = 3.24, $p$ = .067, scripts. Post hoc analyses indicated that tension ratings were significantly higher after Stage 2 of NSSI then significantly decreased with the self-injurious act and remained low throughout Stage 4.

**Tension response – NBPD group.**

***Script differences at each stage.***

Similar to that found for the BPD participants, analyses within the NBPD group showed significant differences across scripts for all stages of the imagery. Specifically, ratings of tension were significantly higher during the NSSI and IC scripts than during the Neutral script across all stages. However, no significant differences across stages were found between the NSSI and IC scripts. The results are presented in Table 4.

Table 4

*Tension ratings: Means, Standard Deviations and Post Hoc Analysis Results for Script Differences at each Stage for the NBPD group*

| | | Script | | | | | |
|---|---|---|---|---|---|---|---|
| Variable | Stage | NSSI | IC | N | df | F | $\eta^2_p$ |
| Tension NBPD | Scene | $67.40_a$ | $40.90_{ab}$ | $16.80_c$ | 2, 18 | $11.98^{***}$ | .884 |
| | | (28.47) | (29.35) | (14.72) | | | |
| | Approach | $65.10_a$ | $78.80_{ab}$ | $11.50_c$ | 2, 18 | $21.38^{***}$ | .704 |
| | | (30.67) | (18.50) | (18.06) | | | |
| | Incident | $60.30_a$ | $83.70_{ab}$ | $5.40_c$ | 2, 18 | $23.89^{***}$ | .726 |
| | | (34.88) | (27.92) | (5.56) | | | |
| | Conseq | $52.50_a$ | $77.90_{ab}$ | $5.00_c$ | 2, 18 | $22.08^{***}$ | .710 |
| | | (37.33) | (19.84) | (6.22) | | | |

Note. N = 19, $^{**}p$ <.01, $^{***}p$ <.001. Standard deviations appear in parentheses below means. Means within rows with differing subscripts are significantly different at least at the $p < .05$ level using Fisher's LSD test.

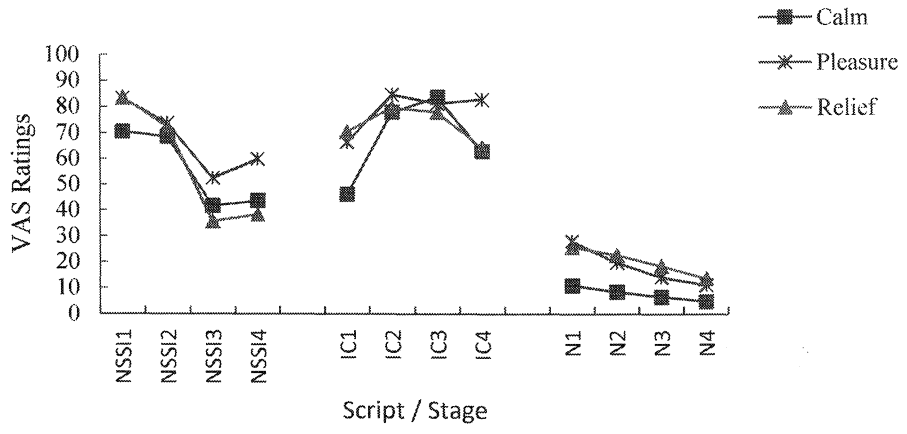
***Across stage change for each script.***

For the NBPD group, tension ratings did not differ significantly across stages for NSSI, $F$ (1.7, 15.5) = .88, $p$ = .421 but the pattern of decrease was consistent with that of a tension reduction. In contrast, and as hypothesised, reported tension levels increased significantly across stages for IC, $F$ (3, 27) = 7.27, $p$ < .001. Post hoc analyses showed that tension was significantly higher after the Incident stage, with the greater increase occurring between the Incident and Scene stages.

Tension ratings did not differ significantly across stages for the Neutral script, $F$ (1.9, 17.5) = 2.61, $p$ = .103.

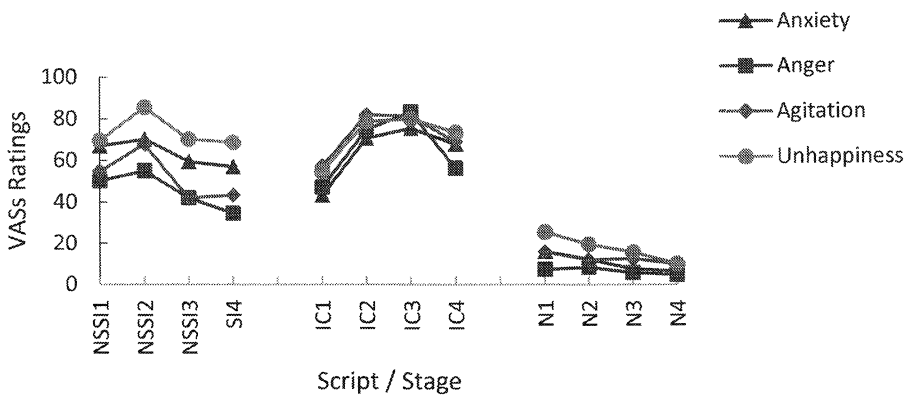
**Significant script x stage interactions for other VASs**

Script by stage ANOVAs showed significant interactions for Anxiety, $F$ (3.8, 63.9) = 4.81, $p$ = .002, $\eta^2_p$ = .221, Anger, $F$ (5.4, 91.4) = 5.16, $p$ <.001, $\eta^2_p$ = .233, Agitation, $F$ (6, 102) = 4.1, $p$ = .001, $\eta^2_p$ = .196, Unhappiness, $F$ (4.3, 73.6) = 3.76, $p$ = .006, $\eta^2_p$ = .181, Relief, $F$ (4.6, 77.5) = 8.42, $p$ <.001, $\eta^2_p$ = .331, Calm, $F$ (3.4, 57.0) = 11.4, $p$ <.001, $\eta^2_p$ = .402, and Pleasure, $F$ (4.9, 83.4) = 5.09, $p$ <.001, $\eta^2_p$ = .230. These results are presented in Figure 3 and Figure 4.




Note. Lower ratings reflect positive psychological responses (e.g. calm, relief, pleasure)

*Figure 3*. Mean VAS Ratings for Calm, Pleasure and Relief for each Stage of each Script.




Note. Higher ratings reflect negative psychological responses (e.g. anger, anxiety, agitation and unhappiness)

*Figure 4*. Mean VAS Ratings for Agitation, Anxiety, Anger and Unhappiness for each Stage of each Script.

Only a trend towards significance was noted for the interaction between script and stage for Arousal, $F$ (4.7, 79.3) = 2.07, $p$ = .083.

***Between script differences for all significant script x stage interactions.***

Consideration was then given to script differences at each stage for the Anxiety, Anger, Agitation, Unhappiness, Relief, Calm and Pleasure responses. The results are presented in Table 5 below.

Table 5

*VAS ratings: Means, Standard Deviations and Post Hoc Analysis Results for Script Differences at each Stage for the BPD and NBPD groups*

| | | Script | | | | | |
|---|---|---|---|---|---|---|---|
| Variable | Stage | NSSI | IC | N | df | F | $\eta^2_p$ |
| Anxiety | Scene | $67.05_a$ | $43.32_b$ | $16.21_c$ | 1.6, 29.7 | $16.00^{***}$ | .471 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | (30.19) | (32.12) | (13.82) | | | |
| | Approach | $70.26_{a}$ | $70.79_{ab}$ | $12.26_{c}$ | 2, 36 | $48.85^{***}$ | .731 |
| | | (27.08) | (23.90) | (13.58) | | | |
| | Incident | $59.53_{a}$ | $75.37_{ab}$ | $7.68_{c}$ | 2, 36 | $39.05^{***}$ | .684 |
| | | (33.02) | (29.31) | (6.38) | | | |
| | Conseq | $57.11_{a}$ | $67.84_{ab}$ | $6.53_{c}$ | 2, 36 | $29.53^{***}$ | .621 |
| | | (32.58) | (33.95) | 5.45 | | | |
| Anger | Scene | $50.47_{a}$ | $47.21_{ab}$ | $7.47_{c}$ | 1.5, 27.5 | $13.74^{***}$ | .433 |
| | | (32.19) | (32.79) | (8.39) | | | |
| | Approach | $55.26_{a}$ | $74.89_{ab}$ | $8.42_{c}$ | 1.6, 28.9 | $28.62^{***}$ | .614 |
| | | (34.79) | (29.21) | 9.64 | | | |
| | Incident | $42.16_{a}$ | $83.26_{b}$ | $5.79_{c}$ | 1.5, 27.0 | $66.75^{***}$ | .788 |
| | | (30.04) | (16.93) | (6.12) | | | |
| | Conseq | $34.58_{a}$ | $56.32_{b}$ | $4.79_{c}$ | 2, 36 | $23.84^{***}$ | .570 |
| | | (29.63) | (31.06) | (4.74) | | | |
| Agitation | Scene | $54.89_{a}$ | $57.16_{ab}$ | $15.95_{c}$ | 2, 36 | $13.83^{***}$ | .435 |
| | | (32.59) | (34.21) | (15.87) | | | |
| | Approach | $68.00_{a}$ | $82.00_{ab}$ | $11.95_{c}$ | 2, 36 | $64.96^{***}$ | .783 |
| | | (27.37) | (20.97) | (14.13) | | | |
| | Incident | $42.16_{a}$ | $81.53_{b}$ | $12.53_{c}$ | 2, 36 | $41.76^{***}$ | .699 |
| | | (32.55) | (17.44) | (16.65) | | | |
| | Conseq | $43.47_{a}$ | $68.84_{b}$ | $9.95_{c}$ | 2, 36 | $22.02^{***}$ | .550 |
| | | (34.50) | (29.42) | (25.35) | | | |
| Unhappiness | Scene | $69.68_{a}$ | $54.95_{ab}$ | $25.58_{c}$ | 2, 36 | $10.80^{***}$ | .375 |
| | | (31.18) | (34.20) | (22.81) | | | |
| | Approach | $85.68_{a}$ | $78.84_{ab}$ | $19.58_{c}$ | 2, 36 | $56.53^{***}$ | .758 |
| | | (16.29) | (23.43) | (19.77) | | | |
| | Incident | $70.37_{a}$ | $79.95_{ab}$ | $15.79_{c}$ | 2, 36 | 40.35 | .692 |
| | | (29.37) | (29.11) | (17.20) | | | |
| | Conseq | $68.79_{a}$ | $73.58_{ab}$ | $10.05_{c}$ | 2, 36 | 34.59 | .658 |
| | | (27.13) | (31.83) | (11.76) | | | |
| Relief | Scene | $83.58_{a}$ | $70.47_{ab}$ | $25.84_{c}$ | 2, 36 | $44.57^{***}$ | .712 |
| | | (16.04) | (28.30) | (17.74) | | | |
| | Approach | $72.47_{a}$ | $79.79_{ab}$ | $22.79_{c}$ | 2, 36 | $32.75^{***}$ | .645 |
| | | (30.00) | (25.08) | (17.55) | | | |
| | Incident | $35.68_{a}$ | $78.05_{b}$ | $18.58_{c}$ | 2, 36 | $27.95^{***}$ | .608 |
| | | (34.95) | (30.34) | (16.79) | | | |
| | Conseq | $38.32_{a}$ | $64.47_{b}$ | $13.68_{c}$ | 2, 36 | $19.73^{***}$ | .523 |
| | | (34.77) | (31.90) | (15.38) | | | |
| Calm | Scene | $70.63_{a}$ | $46.21_{b}$ | $11.11_{c}$ | 2, 36 | $28.29^{***}$ | .611 |
| | | (27.61) | (33.00) | (8.69) | | | |
| | Approach | $68.63_{a}$ | $78.05_{ab}$ | $8.58_{c}$ | 2, 36 | $65.66^{***}$ | .785 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | (26.57) | (23.44) | (8.16) | | | |
| | Incident | $41.68_a$ | $83.68_b$ | $6.68_c$ | 2, 36 | $53.92^{***}$ | .750 |
| | | (32.04) | (23.98) | (6.58) | | | |
| | Conseq | $43.58_a$ | $63.00_b$ | $4.89_c$ | 2, 36 | $27.83^{***}$ | .607 |
| | | (33.74) | (30.27) | (5.01) | | | |
| Pleasure | Scene | $83.21_a$ | $66.47_{ab}$ | $28.05_c$ | 2, 36 | $21.41^{***}$ | .543 |
| | | (19.10) | (32.23) | (22.41) | | | |
| | Approach | $73.84_a$ | $84.74_{ab}$ | $19.74_c$ | 2, 36 | $38.46^{***}$ | .681 |
| | | (29.38) | (22.56) | (16.89) | | | |
| | Incident | $52.42_a$ | $81.32_b$ | $14.16_c$ | 2, 36 | $38.67^{***}$ | .671 |
| | | (32.51) | (28.73) | (15.84) | | | |
| | Conseq | $59.89_a$ | $82.79_b$ | $11.26_c$ | 2, 36 | $43.25^{***}$ | .706 |
| | | (32.15) | (25.91) | (13.94) | | | |

Note. N = 19, $^{***}p < .001$. Standard deviations appear in parentheses below means. Means within rows with differing subscripts are significantly different at least at the $p < .05$ level using Fisher's LSD test.

As shown in Table 5, Anxiety ratings were significantly higher during the Setting the Scene stage for the NSSI script than for the IC and Neutral scripts. Reported anxiety levels decreased with the Incident and Consequence stages of NSSI. In contrast, participants reported an increase of anxiety for the IC script with ratings reaching a peak during the Incident stage. However, the differences between the Approach, Incident and Consequence stages of the NSSI and IC scripts were not statistically significant.

For the Anger and Agitation responses, IC was significantly associated with higher ratings for the Incident and Consequence stages than for NSSI.

Unhappiness ratings were higher for NSSI and IC than for Neutral but no significant differences were found between NSSI and IC.

For the Relief, Calm and Pleasure ratings, NSSI was significantly associated with a higher sense of relief, calm and pleasure than IC for the Incident and Consequence stages.

The Neutral script significantly elicited lower levels of distress (i.e. anxiety, anger and agitation) and higher levels of positive psychological responses (i.e. relief, calm and pleasure) than the NSSI and IC scripts across all stages.

***Across stage changes for all significant script x stage interactions.***

Consideration was then given to across stage changes for each individual script. The results are shown in Table 6 below.

Table 6

*VAS ratings: Means, Standard Deviations and Post Hoc Analysis Results for Stage Differences for each Script for the BPD and NBPD groups*

| | | Stage | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Variable | Script | Scene | Approach | Incident | Consequence | df | F | $\eta^2_p$ |
| Anxiety | NSSI | 67.05 | 70.26 | 59.53 | 57.11 | | ns | |
| | | (30.19) | (27.08) | (33.02) | (32.58) | | | |
| | IC | $43.32_a$ | $70.79_b$ | $75.37_{bc}$ | $67.84_{bcd}$ | 2.3, 1.5 | $9.42^{***}$ | .344 |
| | | (32.12) | (23.90) | (29.31) | (33.95) | | | |
| | N | $16.21_a$ | $12.26_{ab}$ | $7.68_{bc}$ | $6.53_{cd}$ | 2.1,38.1 | $5.60^{**}$ | .237 |
| | | (13.82) | (13.58) | (6.38) | (5.45) | | | |
| Anger | NSSI | 50.47 | 55.26 | 42.16 | 34.58 | | ns | |
| | | (32.19) | (34.79) | (30.04) | (29.63) | | | |
| | IC | $47.21_a$ | $74.89_b$ | $83.26_{bc}$ | $56.32_{ad}$ | 3, 54 | $9.92^{***}$ | .355 |
| | | (32.79) | (29.21) | (16.93) | (31.06) | | | |
| | N | 7.47 | 8.42 | 5.79 | 4.79 | | ns | |
| | | (8.39) | (9.64) | (6.12) | (4.74) | | | |
| Agitation | NSSI | $54.89_a$ | $68.00_b$ | $42.16_{ac}$ | $43.47_{acd}$ | 2.1, 38.0 | $4.17^{*}$ | .188 |
| | | (32.58) | (27.37) | (32.55) | (34.50) | | | |
| | IC | $57.16_a$ | $82.00_b$ | $81.53_{bc}$ | $68.84_{abd}$ | 1.9, 34.4 | $6.15^{**}$ | .255 |
| | | (34.21) | (21.00) | (17.44) | (29.44) | | | |
| | N | 15.95 | 11.95 | 12.53 | 9.95 | | ns | |
| | | (15.87) | (14.13) | (16.65) | (25.35) | | | |
| Unhappiness | NSSI | 69.68 | 85.68 | 70.37 | 68.79 | | ns | |
| | | (31.18) | (16.29 | (29.37 | (27.13) | | | |
| | IC | $54.95_a$ | $78.84_b$ | $79.95_{bc}$ | $73.58_{abc}$ | 1.7, 30.9 | $4.92^{*}$ | .215 |
| | | (34.20) | (23.43) | (29.11) | (31.83) | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | N | $25.58_{a}$ (22.81) | $19.58_{ab}$ (19.77) | $15.79_{ac}$ (17.20) | $10.05_{cd}$ (11.76) | 2.0, 36.2 | $6.96^{**}$ | .279 |
| Relief | NSSI | $83.58_{a}$ (16.04) | $72.47_{ab}$ (30.00) | $35.68_{c}$ (34.95) | $38.32_{cd}$ 34.77 | 3, 54 | $4.64^{***}$ | .448 |
| | IC | 70.47 (28.30) | 79.79 (25.08) | 78.05 (30.34) | 64.47 (31.90) | | ns | |
| | N | $25.84_{a}$ (17.74) | $22.79_{ab}$ (17.55) | $18.58_{abc}$ (16.79) | $13.68_{cd}$ (15.38) | 2.1, 37.6 | $3.90^{*}$ | .178 |
| Calm | NSSI | $70.63_{a}$ (27.61) | $68.63_{ab}$ (26.57) | $41.68_{c}$ (32.04) | $43.58_{cd}$ (33.74) | 2.1, 38.2 | $7.69^{***}$ | .299 |
| | IC | $46.21_{a}$ (33.00) | $78.05_{b}$ (23.44) | $83.68_{bc}$ (23.98) | $63.00_{abd}$ (30.27) | 1.8, 33.8 | $10.46^{***}$ | .368 |
| | N | $11.11_{a}$ (8.96) | $8.58_{ab}$ (8.16) | $6.68_{bc}$ (6.58) | $4.89_{cd}$ (5.01) | 2.1, 37.8 | $6.10^{***}$ | .253 |
| Pleasure | NSSI | $83.21_{a}$ (19.10) | $73.84_{ab}$ (29.38) | $52.42_{c}$ (32.51) | $59.89_{bcd}$ (32.15) | 3, 54 | $5.21^{**}$ | .224 |
| | IC | 66.47 (32.23) | 84.74 (22.56) | 81.32 (28.73) | 82.79 (25.91) | | ns | |
| | N | $28.05_{a}$ (22.41) | $19.74_{ab}$ (16.89) | $14.16_{c}$ (15.84) | $11.26_{cd}$ (13.94) | 1.4, 24.9 | $8.26^{**}$ | .314 |

Note. N = 19, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$. Standard deviations appear in parentheses below means. Means within rows with differing subscripts are significantly different at least at the $p < .05$ level using Fisher's LSD test.

*Across stage changes for the NSSI Script.*

As revealed in Table 6, there were no significant differences across stages for the ratings of Anxiety, Anger and Unhappiness for NSSI (although there was a trend for anger ratings to decrease across stages, $p = .081$). For Agitation, the Approach stage was associated with higher ratings than the Scene, Incident and Consequence stages. Ratings of calm, relief and pleasure were lower after the Incident stage than after the Scene and Approach stages indicating a shift from negative psychological state to a more positive state after the act of NSSI.

*Across stage changes for the IC Script.*

For IC, and as shown in Table 6, Anxiety ratings showed a significant increase between the Scene and Consequence stages, with higher ratings reported

after the Incident stage. Higher ratings for Anger were elicited after the Approach and Incident stages than the Scene and Consequence stages. Similarly, higher levels of Agitation were reported after the Approach and Incident stages than after the Scene stage. There was also a significant difference for Agitation levels between the Incident and Consequence stages, but only a trend towards significance was noted between the Approach and Consequence stages ($p = .055$). For Unhappiness, ratings only increased significantly between the Scene and Approach stages.

Although no significant results were found across stages for Relief, the pattern of subjective experience showed an increase of ratings (i.e. less relief) with Stages 2 and 3. Similarly, Pleasure ratings did not significantly differ across stages but the results showed that IC was associated with lower ratings of pleasure by the end of the imagery. For the Calm response, lower levels of calm were found after the Incident stage than the Scene and Consequence stages. Only a trend towards significance was found between the Approach and Consequence stage for Calm ($p = .056$).

*Across stage changes for the Neutral Script.*

Variations across stages were found for Anxiety, Unhappiness, Relief, Calm and Pleasure for the Neutral script. Specifically, higher positive emotional states were found after the Consequence stage than the Scene and Approach stages with participants reporting lower Anxiety and Unhappiness and higher Relief, Calm and Pleasure after the Consequence stage of the imagery. It was also noted that Anxiety ratings were significantly lower after the Incident stage than the Scene stage. Similarly, the Incident stage was associated with more pleasure than the Scene stage. A trend towards significance was noticed between the Scene and Approach stages ($p$

= .075), as well as between the Incident and Consequences stages ($p$ = .052) for Pleasure.

No significant variation across stages was found for Anger and Agitation.

**Main effect analyses for non-significant script x stage interactions**

The results revealed a significant main effect for script for Unhapiness, $F$ (1.7, 29.0) = 31.12, $p$ <.001, $\eta^2_p$ = .647. Both groups reported higher ratings of Unhappiness in response to IC, $M$ = 77.66, $SE$ = 8.64, 95% CI [59.43, 95.90] than Neutral, $M$ = 17.86, $SE$ = 3.70, 95% CI [10.07, 25.66] and SI, $M$ = 73.77, $SE$ = 3.67, 95% CI [66.03, 81.51]. Post hoc analyses rated Unhappiness scores significantly higher ($p$ < .001) for IC than Neutral. Similarly, Unhappiness ratings for the Neutral scripts were significantly lower ($p$ <.001) than those for the NSSI script. Unhappiness responses to the IC and NSSI scripts did not differ significantly ($p$ = .689). Significant differences across scripts were also noted for Excitement, $F$ (2, 34) = 7.3, $p$ = .002, $\eta^2_p$ = .299 with both groups reporting lower level of Excitement in response to IC, $M$ = 73.50, $SE$ = 4.30, 95% CI [59.79, 78.57], than in response to NSSI, $M$ = 69.18, $SE$ = 4.45, 95% CI [64.43, 82.59] and Neutral $M$ = 47.45, $SE$ = 6.51, 95% CI [33.73, 61.18]. Post hoc analyses revealed significant differences between the IC and Neutral scripts ($p$ = .005), as well as between the NSSI and Neutral scripts ($p$ = .015). Excitement responses to the IC and NSSI scripts did not differ significantly ($p$ = .447).

The results revealed a significant main effect for stage for Boredom, $F$ (2.7, 46.3) = 6.78, $p$ = .001, $\eta^2_p$ = .285 with both groups reporting decreasing ratings of boredom across stages ($M_{scene}$ = 31.25, $SE_{scene}$ = 4.63 , 95% $CI_{scene}$ [ 21.48, 41.02], $M_{Appoach}$ = 24.78, $SE_{Appoach}$ = 4 .25 , 95% $CI_{Approach}$ [ 15.30, 33.25], $M_{Incident}$ = 22.55, $SE_{Incident}$ = 4.18 , 95% $CI_{Incident}$ [ 13.73, 31.37], $M_{Consequence}$ = 21.52, $SE_{Consequence}$ =

3.56, 95% $CI_{Consequence}$ [ 13.99, 29.04]) Post hoc analyses revealed significant differences between the Scene stage and the Approach ($p$ = .005), Incident ($p$ = .007) and Consequences stages ($p$ = .005). The Approach stage did not differ significantly from the Incident ($p$ = .357) and Consequence ($p$ = .214) stages. Similarly, there was no significant difference in the ratings for Boredom across the Incident and Consequence stages ($p$ = .610).

## Discussion

The aim of this study was to explore the differences in the psychophysiological and psychological responses to non-suicidal self-injury and interpersonal conflict of individuals with and without Borderline Personality Disorder characteristics. Specifically, this study aimed to provide further evidence for a potential self-stimulatory function of NSSI and extend the findings to interpersonal relationships for those with BPD. Previous studies (Kleindienst et al., 2008; Osuch, Noll, & Putnam, 1999) have reported different motivations for the acts of NSSI among individuals with BPD (e.g., automatic negative reinforcement and/or automatic positive reinforcement). However, the literature is yet to establish whether or not interpersonal conflicts serve the same function as NSSI in such populations.

Specifically, it was predicted that participants from the Borderline Personality group would demonstrate increased heart rate and a shift from negative emotional state to a positive emotional state during episodes of NSSI and IC. In contrast, it was expected that the NBPD group would demonstrate a pattern of tension reduction as indicated by a reduced heart rate and a shift from distress to calm with the act of NSSI. Furthermore, it was hypothesised that interpersonal conflict would result in an increased heart rate and a move towards increasingly high arousal, negative psychological state (e.g., distress) for the NBPD group.

**Summary of main results**

Contrary to expectations, no group differences were revealed for the psychophysiological ratings and all but one of the psychological responses. Specifically, both groups demonstrateded higher heart rate in response to interpersonal conflict than to NSSI and the neutral event. However, as expected, heart rate was significantly higher during NSSI than during the emotionally neutral event for both the BPD and NBPD groups. No differences across stages were reported for heart rate.

In terms of psychological responses, differences among the two groups were only found for ratings of tension. Contrary to expectations, the results indicated support for the tension reduction model during the act of NSSI for the BPD group. Specifically, individuals with borderline characteristics reported a decrease of tension that began with the act of NSSI and was maintained in its immediate aftermath. This was not as evident for the NBPD group, with no significant across stage changes revealed for NSSI. However, it is worth noting that the pattern of decrease was consistent with that of a tension reduction response for this group. Because no group differences were found when the other psychological responses were considered, it was important to explore script by stage interactions across groups to investigate whether the results provided further evidence of a tension response or an arousal increase for all the participants. Significant script by stage interactions were found for the anxiety, anger, agitation, unhappiness, calm, relief and pleasure responses. The results indicated a shift from negative emotional states to positive emotional states (e.g., increased feelings of calm, pleasure, relief) with the act of NSSI, therefore suggesting further evidence for the affect regulation function of NSSI, as reflected by a change from distress to calm.

Both groups reported more negative emotions during interpersonal conflict than during NSSI. Specifically, IC generally elicited more anxiety, anger and agitation than NSSI. Interestingly, tension ratings were significantly higher during interpersonal conflicts than during NSSI for the BPD group only. Additionally, NSSI was associated with more positive emotional states (i.e. calm, relief and pleasure) than IC for both groups, especially during and after self-injury.

Not as expected, boredom did not differ across scripts for either of the groups. However, the results generally showed a decrease in boredom across stages, with participants from both groups reporting more boredom at the start of the imagery than at the end. Also contrary to expectations, there was no variation in excitement across stages for the NSSI and IC scripts for neither of the groups. Nevertheless, both groups indicated lower levels of excitement during interpersonal conflict. Ratings of arousal did not differ significantly across script nor stages. However, this lack of statistical evidence for arousal change across script or stage may have been the result of a lack of understanding of the subjective experience investigated. In effect, several participants asked for clarification of the variable before rating. It may be that others may not have been willing to ask for clarification and, therefore, did not rate their level of arousal appropriately.

Minimal variation across stages were revealed for the Neutral script for some of the psychological responses. However, the Neutral script typically elicited lower levels of distress (i.e., anxiety, anger, unhappiness and agitation) and higher levels of positive psychological responses (i.e., relief, calm and pleasure) than the NSSI and IC scripts across the imagery.

**Interpretation of the findings**

It appears that the results from this study provide further evidence for the affect regulatory function of NSSI, especially among individuals with borderline personality traits. Affect regulation is typically discussed in terms of a shift from a high arousal negative psychological state (e.g., distress) to a low arousal and positive psychological state (e.g., calm). This direction of affect regulation was evident in the present study and consistent with previous research of affective state changes following the act of NSSI in both clinical and non-clinical samples (Haines et al., 1995; Kleindienst et al., 2008; Laye-Gindu & Schonert-Reichl, 2005).

There is robust evidence to suggest that individuals with BPD use NSSI as a means to achieve quick relief from negative emotions (Kleindienst et al., 2008; Chapman et al., 2006) and from strong aversive inner tension (Brown, Comtois, & Linehan, 2002; Osuch et al., 1999). Studies have suggested that patients with borderline characteristics experience significantly more intense feelings of tension more frequently than patients with Axis I diagnoses (e.g., anxiety and depressive disorders) or than healthy controls (Ebner-Priemer et al., 2008; Stiglmayr et al., 2001). This was clearly evident in the current study, with individuals from the BPD group reporting significantly higher tension ratings than their counterparts in the NBPD group prior to NSSI, as well as a significantly higher tension reduction during and immediately after the self-injurious act.

Previous research has suggested that individuals who typically experience intense emotions are more likely to use avoidance and inhibition to cope with emotionally strong experiences (Lynch et al., 2001). Additionally, studies have found that individuals with stronger emotional intensity are at a greater risk of

engaging in NSSI as a way to escape their emotions (Chapman et al., 2006). This is consistent with the Experiential Avoidance Model (EAM, Chapman et al., 2006) that suggests that NSSI is primarily maintained by negatively reinforced strategies such as escape from, or avoidance of, aversive emotional states. Chapman and colleagues (2006) further suggested that individuals who are prone to engaging in NSSI may not necessarily have heightened emotional arousal, but rather a lower tolerance for emotional arousal (i.e., lower distress tolerance). A low tolerance for emotional distress would be expected to increase the likelihood of engaging in experiential avoidance behaviour, such as NSSI, in order to eliminate the emotional arousal (Chapman et al., 2006).

It has been suggested by Linehan (1993) that distress tolerance may be influenced by the degree to which people experience their emotional arousal as aversive or unpleasant, regardless of the actual level of intensity of the arousal (Chapman et al., 2006). In a study of 24 female patients diagnosed with BPD and 27 controls, Herpertz, Hanns, Kunert, Schwenger and Sass (1999) showed that patients with BPD showed a less pleasant reaction to positive pictures in comparison to the control participants. This was indicated by less positive self-ratings and further supported by the physiological recordings (i.e., heart rate and startle response) which indicated a lower arousal in response to the pleasant images for the BPD group (Herpertz et al., 1999). In contrast, responses to negative stimuli were expressed as distressing and largely comparable between the two groups. This finding may be explained by the pervasive dysphoria in BPD, which may reduce pleasant experiences to positive stimuli (Herpertz et al., 1999).

Other psychophysiological studies have reported that individuals with BPD do not necessarily experience greater physiological reactivity to emotional stimuli

than normal controls, but instead report greater affect sensitivity in their subjective responses (e.g., Herpetz et al., 1999). This was evident in the present study with no significant psychophysiological results reported but with significant psychological responses to the emotional stimuli found. Therefore, concordant with the EAM (Chapman et al., 2006), it is possible that the subjective experience of more distressing emotional arousal make it considerably more difficult to tolerate negative emotional states. This would lead to attempts to escaping behaviours, at least for people with Borderline characteristics.

Although functions of NSSI are typically understood as processes of affect regulation and tension-reduction, motivations such as mood enhancement and excitement among persons with BPD have also been reported in previous literature (Kleindienst et al., 2008; Osuch et al., 1999). These findings have been tentatively supported by a psychophysiological study (Bowe, 2010) that provided evidence for a heightened psychophysiological arousal in response to NSSI among adults with BPD. Contrary to expectations, the present study did not provide any support towards a self-stimulatory function of NSSI among individuals with BPD. Instead, and as mentioned previously, NSSI was negatively reinforced and mostly motivated by tension relief.

It is largely unknown whether there are distinct subgroups of BPD individuals who differ in their motives for NSSI. Suggestions for motivations for NSSI have included negative reinforcement (e.g., to stop bad feelings), positive reinforcement (e.g., "to get a kick", "to feel something"; Kleindienst et al., 2008; Osuch et al., 1999) and social reinforcement (e.g., to get attention from others; Hosmer, 2009). However, much of the research has focused on the most salient motives, mainly negatively reinforced behaviours (Kleindienst et al., 2008). A study

by Osuch et al. (1999), examining the motivations for NSSI in 99 psychiatric inpatients, found evidence for NSSI-related subgroups. Specifically, in that study, motives for NSSI were associated with six different motivational factors namely: affect modulation (e.g., "to help me escape from uncomfortable feelings or moods"), desolation (e.g., "to diminish feeling so empty"), punitive duality (e.g., "to punish myself for positive feelings or experiences"), influencing others (e.g., "to express anger at or seek revenge toward others"), magical control (e.g., "to "protect" important people in my life") and self-stimulation (e.g., "to provide a sense of excitement or stimulation that feels exhilarating"). However, their sample included patients with a wide range of psychopathologies and, therefore, cannot be generalised to BPD individuals specifically.

Kleindienst et al. (2008) studied the motives for NSSI among women with BPD exclusively. Their results showed evidence for both negative and positive reinforcement with induction of pleasant states with the act of NSSI playing a significant role in about half of their patients. Contrary to expectations, the present study did not provide further evidence for positive reinforcement behaviours for either of the BPD nor NBDP groups. Nevertheless, it seems important to report that two participants from the BPD group described their motivations for NSSI during the clinical interview as a way to "cure boredom". However, these reports were not evident in their ratings of subjective responses. It may be possible that individuals who engage in NSSI, and more specifically people with BPD, have learned that they are more likely to obtain sympathetic responses from others if the true nature of their behaviours is not revealed. Indeed, this has been suggested in previous literature (Allen, 1995; Nichols, 2000). Specifically, researchers have proposed that an underlying purpose for NSSI is to obtain nurturing and sympathetic responses from

others (Allen, 1995; Nichols, 2000). Therefore, it may be a possibility that, when questioned about their self-injurious behaviours, people disclose socially desirable and self-protective accounts to avoid any further stigma and /or socially negative reinforcement (e.g., to be punished by others, Nock & Prinstein, 2004).This would be particularly relevant for people with BPD when considering their chronic fear of rejection and abandonment from significant others (DSM-5, APA, 2013). Further study should investigate the processes associated with NSSI for people with different combinations of BPD symptoms. In particular, since five or more of the nine criteria must be met for a diagnosis of BPD (APA, 2013), there are 126 different ways of meeting the diagnosis (Asnaani et al., 2007), therefore, it is likely that individuals with BPD will have different combinations of symptoms. It may be that different subgroups based on different combinations of symptoms may respond differently to demands and that their NSSI serve a variety of functions, even within an affect regulation framework (e.g. some will be tension-reducing, some self-stimulatory). This should be considered in light of the current results as it may provide a tentative explanation for the failure to replicate Bowe's (2010) study, using the same methodology. Asnaani et al. (2007), in a study of 237 outpatients diagnosed with BPD revealed that greater heterogeneity in BPD criteria was associated with greater severity of the disorder as reflected by higher rates of comorbidity and greater psychosocial impairment (Asnaani et al., 2007). Therefore, is seems that further study on the different combinations of symptoms is warranted to ensure better treatment interventions.

The results from this study provided further support for the negative emotional sensitivity to interpersonal stressors for people with BPD. Indeed, although interpersonal conflict was generally associated with more distress as shown

by both increased physiological arousal and negative subjective experiences for both groups, only the BPD group reported significantly higher tension during the incident stage of the interpersonal conflict than during NSSI or a neutral event. This is consistent with prior reports that individuals with borderline personalities have increased emotional reactivity to interpersonal distress (APA, 2013; Hilt et al., 2008; Stanley & Siever, 2010). More specifically, it has been suggested that the preservation of interpersonal intimacy not only aims to maintain significant relationships but also and, most importantly, to provide a sense of cohesiveness of self among individuals with BPD (Stanley & Siever, 2010). Thus, resulting in higher distress when the interpersonal relationship is threaten. It would be interesting for further research to investigate and compare the function and the effect of interpersonal conflict of people with different presentations of BPD.

**Limitations of the study**

This study has several limitations. First, the sample size was small and more statistical power to detect differences between the two groups would have been desirable. Although studies (e.g., Whitlock et al., 2006) have recognised the prevalence of NSSI in university populations, seeking participants from clinical populations may assist future studies in recruiting a larger sample with more severe psychopathology which would allow further clarification of the nature and strength of the results. Second, the data were collected retrospectively, therefore, the participants had to mentally reconstruct their emotional and physical reactions from memory. However, most participants had engaged in NSSI in the month prior to recollection and participants reported a good ability to mentally re-experience the event (see Appendix H). In another study (Kleindienst et al., 2008) that used retrospective data to investigate the motivations for NSSI, the authors showed that

the amount of time elapsed since the period of the most intense NSSI was not related to emotion recollection preceding and following NSSI. Additionally, the use of personalised imagery has been effective in eliciting realistic emotional reactions that mirror the responses that would occur in the natural environment (Haines et al., 1995). Therefore, it is reasonable to suggest that the general pattern of results found in the current study are valid.

**Conclusion and implications for future research**

NSSI has become an increasingly pervasive problem in recent years, especially in clinical populations (Klonsky, 2007; Wester & Trepal, 2005). However, despite increasing attention, limited research has investigated the different motives for NSSI in populations with and without Borderline Personality Disorder. Specifically, it has been previously suggested that even though NSSI is most often associated with negatively reinforced behaviours, it is not always the case. Indeed, studies have tentatively proposed a self-stimulatory function of NSSI, with some BPD individuals experiencing feelings of excitement and increased arousal with the act of NSSI (Kleindienst et al., 2008; Osuch et al., 1999). The findings in the current study did not provide additional support to this theory. Instead, the results were consistent with the tension-reduction model of NSSI, put forward in other research (Brain, Williams, & Haines, 1998, 2002; Klonsky & Muhlenkemp, 2007).

However, it is important to note that different subgroups of people have been reported in terms of motives for NSSI. Studies have compared individuals with and without BPD with regards to diagnostic comorbidity (Shea et al., 2004), childhood experiences (Sansone, Sonyer, & Miller, 2005) and longitudinal course (Warner et al., 2004) but few researchers have investigated the differences within individuals

with BPD to account for heterogeneity within the disorder (Asnaani et al., 2007). Given the potential problematic nature of heterogeneity within the disorder, further identification of subgroups, based on different combinations of features seems crucial as prevention work and treatment approaches may be different depending on the function of NSSI.

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## Appendix A

### Participants' Information sheet and informed consent form

# Investigating the Motivations for Self-Injury and Interpersonal Conflicts in Adults with and without Borderline Personality Characteristics.

Project Information Statement for Participants

### Invitation

This study is investigating the motivations for non-suicidal self-injury (e.g. self-cutting) and interpersonal conflict in individuals presenting with and without borderline personality characteristics.

You are invited to participate in a research project being conducted by Julie Jammet as part of her training in a Clinical Psychology Master degree, under the supervision of Dr. Janet Haines. This information sheet describes the project in straightforward language, or "plain English". Please read this sheet carefully and be confident that you understand its content before deciding on whether to participate

### What is the purpose of this study?

Recent research has found different motivations for the act of non-suicidal self-injury in adults with and without borderline personality characteristics. That is, non-suicidal self-injury is typically regarded as a strategy to control intense, overwhelming negative emotions such as anxiety, anger, loneliness, guilt, and frustration. Interestingly, other motives such as mood enhancement and excitement have recently been suggested for adults with borderline personality types, with some participants reporting a positive emotional response to self-harm.

Knowing that individuals with borderline personality characteristics often report being impulsive and having difficult interpersonal relationships characterised by repeated breakups and frequent arguments, it would be interesting and beneficial for this particular group of people to understand their motivations behind self-harm and interpersonal conflicts, and, in particular, to investigate whether these behaviours have the same effect on adults with borderline characteristics.

### Why have I been invited to participate?

You have been invited to participate in this study to gain a better understanding of the motivations behind non-suicidal self-injury and interpersonal conflicts that may be part of your life. A better understanding of these motivations may have important implications for the management and possible treatment of these behaviours.

Participation is entirely voluntary, there will be no consequences if you decide not to participate.

To be a participant in this study, you need to have a history of self-injury (e.g. self-cutting), that is having self-injured in the past and/or currently engaging in self-injurious behaviours.

## What will I be asked to do?

As a participant, you will be asked to attend two sessions which will take place in one the School of Psychology research laboratory room:

- A preliminary session will consist of gathering demographic information as well as other information required for group allocation (i.e. group with borderline characteristics and group without borderline characteristics). The student investigator (Julie Jammet) will also ask you to recall three types of situation: one involving a self-injurious act, one relating to an interpersonal conflict and a neutral event such as making a cup of tea. These descriptions will be audio recorded to help the student investigator develop scripts related to your experiences in between sessions.

- In a secondary session, these scripts will be read back to you and psychophysiological measurements recorded, that is, two small electrodes will be placed on your chest and one at the back of your head to monitor your heart rate. You will also be asked to rate emotional responses such as anger, unhappiness, tension, anxiety, agitation, relief, boredom, calmness, pleasure, liveliness and excitement to the scripts on a scale from 0 to 100.

Each session will last approximately one hour. Debriefing about the session will be provided after each session.

## Are there any possible benefits from participation in this study?

Borderline personality disorder is a common mental condition that is best predicted by the combination of non-suicidal self-injury and unstable relationships.

By participating in this project, you will help identify the potential motivations associated with non-suicidal self-injury and interpersonal conflicts in adults with and without borderline characteristics, and, therefore, assist in providing further evidence for preventive health interventions.

## Are there any possible risks from participation in this study?

The risks associated with your participation in this project should be considered. The electrodes used for psychophysiological recordings may cause a minor skin rash for some people. Recall of specific self-injurious episodes and interpersonal conflicts may elicit feelings of anxiety, stress, shame and embarrassment or regret. If you feel you will be unduly upset by talking about such events, please do not participate in this study.

If participants do experience such feelings or concerns as a result of their participation, the student investigator is a provisionally registered psychologist and her supervisor, Dr. Janet Haines is a registered psychologist, both are able to suggest appropriate debriefing and referral, if necessary. Dr. Janet Haines can be contacted by phoning UTAS on 03 6226 7124.

Additionally, if participants wish to access counseling services without needing to contact the main investigators, here is a list of available services:

**University Psychology Clinic (UPC):**

Phone: (03) 6226 2805

Email: clinic@psychol.utas.edu.au

**Student Counseling**

Phone: (03) 6226 2697

**Lifeline**

Phone: 13 11 14 (24hrs)

Or consult your **GP**.

## What if I change my mind during or after the study?

You are free to withdraw from the study at any time, and you are able to do so without providing an explanation.

If a participant chooses to withdraw from the study, their data will be removed and destroyed.

## What will happen to the information when this study is over?

Any information provided by the participant will only be seen by the student investigator and her supervisor. The information will be de-identified and stored safely in a locked cabinet within the laboratory of the School of Psychology for a period of five years. After this period, all data will be destroyed by shredding paper and erasing audio recordings.

The information may be combined with information from other studies, published in a scientific journal and/or be presented at professional conferences. In any of these cases, there will no information that can identify the participant.

## How will the results of the study be published?

A summary of results will be available in hard copy or electronic form on the School of Psychology website at the completion of the project.

## What if I have questions about this study?

If you have any questions about the study, please contact:

Ms Julie Jammet, BSc (Hons); Master student

Student Investigator, School of Psychology, UTAS.

Contact details: jjammet@utas.edu.au

Dr. Janet Haines, BA (Hons); PhD.

Chief Investigator, School of Psychology, UTAS.

Contact details: J.Haines@utas.edu.au, 03 6226 7124

"This study has been approved by the Tasmanian Social Sciences Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study, please contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. Please quote ethics reference number [H0012755]."

**This information sheet is for you to keep. If you choose to participate in the proposed study, you will be asked to sign a written consent form that will be provided to you before any proceedings.**

# Investigating the Motivations for Self-Injury and Interpersonal Conflicts in Adults with and without Borderline Personality Characteristics.

Participant Consent Form

1. I agree to take part in the research study named above.
2. I have read and understood the Information Sheet for this study.
3. The nature and possible effects of the study have been explained to me.
4. I understand that the study involves two sessions lasting approximately one hour each, during which I will be asked to answer questionnaires and recall experiences of a specific non-suicidal self-injury act, interpersonal conflict and neutral event. These descriptions will be audio recorded and psychophysiological measurements made as part of the study.
5. I understand that participation involves the risk(s) that I may develop a minor skin rash as a result of the psychophysiological recordings and may experience feelings of anxiety or stress when disclosing sensitive personal information.
6. I understand that all research data will be securely stored on the University of Tasmania premises for five years from the publication of the study results, and will then be destroyed.
7. Any questions that I have asked have been answered to my satisfaction.
8. I understand that the researcher(s) will maintain confidentiality and that any information I supply to the researcher(s) will be used only for the purposes of the research.
9. I understand that the results of the study will be published so that I cannot be identified as a participant.
10. I understand that my participation is voluntary and that I may withdraw at any time without any effect.

Participant's name: _____

Participant's signature: _____

Date: _____

**Statement by Investigator**

☐ I have explained the project and the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation.

If the Investigator has not had an opportunity to talk to participants prior to them participating, the following must be ticked.

☐ The participant has received the Information Sheet where my details have been provided so participants have had the opportunity to contact me prior to consenting to participate in this project.

Investigator's name: _____

Investigator's signature: _____

Date: _____

## Appendix B

## Demographic Information Questionnaire

Please indicate your gender? **M / F**

Please indicate your age (in years)? _____

Marital status: ☐ Single ☐ Separated/Divorced
☐ Married/ de Facto ☐ Widow/er

Are you pregnant? **Y / N**
Is there any chance that you could be pregnant? **Y / N**

Education: Level Completed

☐ Primary ☐ TAFE
☐ Secondary ☐University
☐ Year 12

Self-Injury:

Have you engaged in any self-injury behaviour in the last year? **Y / N**

What was the nature of the self-injury behaviour (e.g. skin cutting, skin burning, head banging…)?

---

When was the last time you injured yourself?

☐ In the last month
☐ In the last 6 months
☐ In the last year
☐ More than 1 year ago

On average, how often would you engage in self-injury?

☐ Daily
☐ Weekly
☐ Fortnightly
☐ Monthly
☐ Yearly

Overall, approximately how many times have you engaged in self-injury?

☐ Less than 5
☐ More than 5 but less than 50
☐ 100 times or less

☐ 500+

If you know specifically how many times, please indicate:

_____

How long (i.e. how many months or years) have you been engaging in self-injury?

_____

What are / were you main motivations for self-injury? (e.g. "I injure / have injured myself to .....")

_____

_____

_____

Have you ever sought psychological assistance (e.g. counseling / therapy) for self-injury? **Y / N**

<u>Interpersonal conflicts:</u>

When was the last time you engaged in an interpersonal conflict (e.g. argument with someone else)?

☐ In the last month
☐ In the last 6 months
☐ In the last year
☐ More than 1 year ago

On average, how often do you engage in interpersonal conflicts?

☐ Daily
☐ Weekly
☐ Fortnightly
☐ Monthly
☐ Yearly

Please describe how you felt as a result of the conflict (e.g. upset, excited, tense, relieved...):

_____

_____

_____

# Appendix C

## Examples of personalised scripts

**Script: Neutral**

**Scene:** I want you to remember back to this morning. You are at your sister's house, in the bathroom. It's quite early in the morning. You have just finished taking a nice hot shower and you are feeling fairly happy. You are calm and relaxed. You are thinking that a cup of tea would be good. Concentrate on what you are feeling right now [pause]. Open your eyes and switch the scene off.

**Approach:** You walk to the kitchen. Notice the old horseshoe shape kitchen with the square type lino and the big fridge you gave to your sister. You check that the kettle has enough water in it, it does so you press the red button to turn it on. You are still feeling calm and relaxed. You grab your cup, the one saying "Uncle Ben" and place it next to the kettle. You open the tea canister and grab a teabag out. You then take a spoon out of the glass cup next to the kettle and put two spoons of raw sugar in your cup. You prefer raw sugar. Concentrate on feeling calm and relaxed [pause]. Open your eyes...

**Incident:** You grab the milk out of the fridge, it's about ¾ full, and it's bloody cold. You place it next to your bowl of cornflakes, waiting the kettle to boil. The water is ready so you pour water to about 1cm to the top. You like you tea to have that weak coffee colour. You take your cup to the milk and pour a splash in, getting a little excited thinking its cup of tea time. You stir the milk in, squeeze your teabag with the spoon to get all the tea out and put it in the bin. You are feeling happy, calm and relaxed. Concentrate on those feelings right now [pause]. Open your eyes....

**Consequence:** You finish making your cereals with the milo and the milk. You go and sit down at the table. You take a sip of your tea. You are enjoying the warmth and taste of it in your mouth. Focus on how nice it feels. You are feeling good and relaxed. Concentrate on those feelings right now [pause]. Open your eyes...

**Script: IC**

**Scene:** I want you to remember back to Wednesday when you were at your sister's house with your mum. You have been looking after the kids all day. You are feeling quite happy. Your sister comes home feeling shitty and blames your mum for not taking XXX to her drama class. She is quite upset and having a go at your mum. You are starting to feel anxious and pissed off. Concentrate on how you are feeling right now [pause]. Open your eyes...

**Approach:** The kids have been fed and they're all in bed. You can tell that XXX is angry at your mum so you ask them to sit down and sort this out. You are sitting at the head of the table with your mum on your left and XXX on your right. You are quite irritated because XXX does not look interested; she's not listening just having a go at your mum. You are trying to remain calm but you can feel the anxiety, the pain in your chest. It actually hurts. Concentrate on how you are feeling right now [pause]. Open your eyes...

**Incident:** XXX keeps going and on, getting louder to the point of screaming. You are trying to be rationale but it's not working. She stands up screaming so your mum gets up too and go to sit on the couch. You are both raising voices, she is saying things like "it's your fault; you wanted us to sit down". You are feeling more anxious, really annoyed and angry. She is not listening, just yelling. You walk around to the other side of the kitchen bench and follow your sister. You are so mad that you want to punch her in the face to shut her up. You flip the little table and grab her by the arms. She is being psychotic now, screaming really hard. Concentrate on how that is making you feel [pause]. Open your eyes....

**Consequence:** Your mum gets up and slaps XXX in the face. You decide to take a step back, it's time to go. The kids are screaming and crying, probably scared. You don't want to be here anymore. So you take your mum by the arm and leave the house. You are feeling numb, not really thinking at this point. Concentrate on how you are feeling [pause]. Open your eyes....

**Script: NSSI**

**Scene:** I want you to imagine that it is about 4 years ago. You are the base in your room. It's the evening and you have been drinking beer previously. You get a call from your girlfriend, XXX, and she tells you that she does not want to move in with you anymore. You are feeling hurt, alone and angry. There is so much pain inside you. Concentrate on how you are feeling right now [pause]. Open your eyes and switch the scene off.

**Approach:** The pain is kind of unbearable, your chest feels sore, so much hurt and sorrow. You are feeling lost and rejected. Concentrate on how you are feeling right now. You start looking for something in your room to cut with. You notice the can of baked beans sitting on the shelf above the desk. You are proud of yourself for having found something, getting a little excited even. Concentrate on those feelings right now [pause]. Open your eyes....

**Incident:** You sit back down on the chair and turn the ring around and lift the lid off the can. You look at your left arm, thinking that you can't cut lengthways, you don't want to die, you just want the pain to stop. So you cut across you wrist from left to right, in a slow and deliberate movement. You can feel the pain as the blade goes through your skin. But you are not really surprised by it, you expected it. You catch yourself smiling, it actually feels pleasurable, all your focus is on the cutting not the emotional pain. It feels good and relieving. Concentrate on those feelings right now [pause]. Open your eyes ....

**Consequence:** There is a lot of blood coming out, you did not expect so much blood and you are kind of shocked by it. You don't really pay attention to the pain. You are a bit worried at the amount of blood coming out; you don't really know what to do. So you grab the brown towel from the bathroom and use it to put pressure on the cut. You are not stressing too much about the amount of blood staining the towel. You are still feeling calm and relaxed from the cutting. Concentrate on these feelings right now [pause]. Open your eyes...

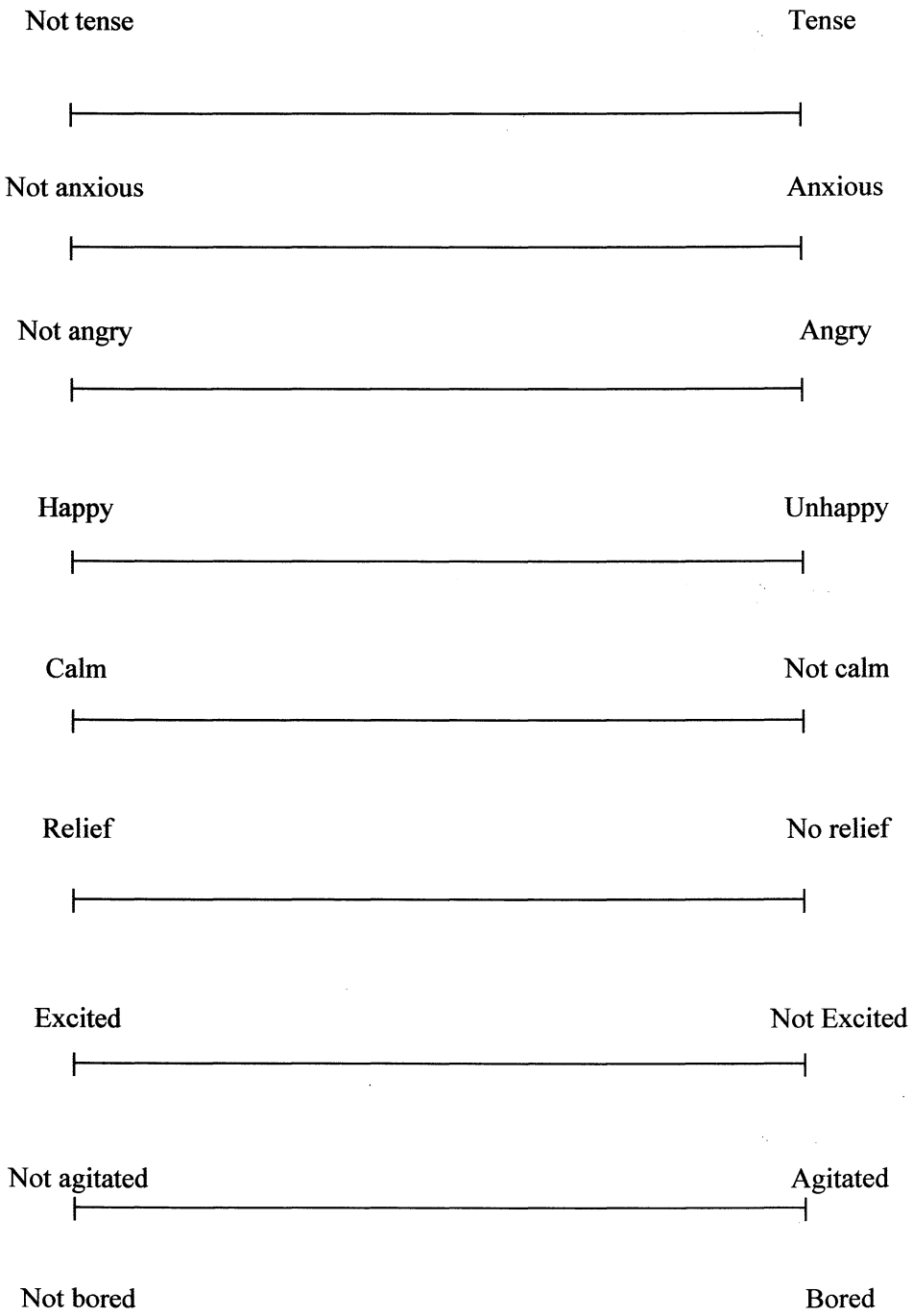
## Appendix D

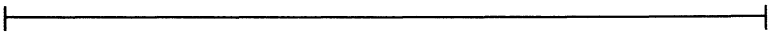
## Visual analogues scales

Visual Analogue Scale

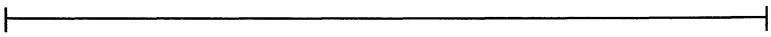
**Script:**

**Stage:**

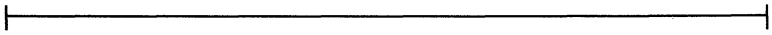




Pleasurable Not Pleasurable

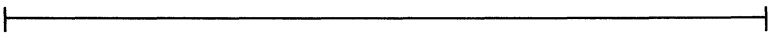


Aroused Not Aroused



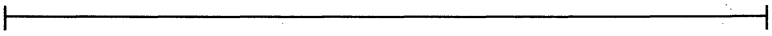
**How clear was your image of the scene described?**

Unclear Clear



**How close to real life was that scene?**

Not close Close



# Appendix E

## Psychophysiological responses to imagery
## Group x Script x Stage means and standard deviations

Table 7
*Mean heart rate scores and standard deviations for each stage of each script for the BPD and NBPD groups*

| | Scene | | Approach | | Incident | | Consequence | |
|---|---|---|---|---|---|---|---|---|
| Heart Rate | M | SD | M | SD | M | SD | M | SD |
| *NSSI* | | | | | | | | |
| BPD | 85.4 | 11.5 | 84.1 | 10.7 | 81.3 | 14.1 | 81.4 | 13.4 |
| NBPD | 82.4 | 8.1 | 82.4 | 7.2 | 82.2 | 8.2 | 80.7 | 7.9 |
| *IC* | | | | | | | | |
| BPD | 85.4 | 8.8 | 84.5 | 9.5 | 84.4 | 10.7 | 86.9 | 16 |
| NBPD | 84.3 | 8.5 | 84.6 | 7.6 | 84.1 | 7.2 | 82.6 | 7.2 |
| *Neutral* | | | | | | | | |
| BPD | 79.9 | 10.3 | 79.7 | 11.1 | 80.1 | 10.2 | 80.8 | 11 |
| NBPD | 77.9 | 7 | 77.6 | 7.3 | 77.7 | 7.1 | 78.5 | 6.4 |

# Appendix F

## Psychological Responses to VASs

## Group comparisons at each stage of each script for Tension

Table 8
*Group differences for Tension at each stage of each script*

| | BPD | | NBPD | | | | |
|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *df* | *t* | *p* |
| **NSSI** | | | | | | | |
| Scene | 68.0 | 30.5 | 67.4 | 28.5 | 17 | .04 | .96 |
| Approach | 86.9 | 13.8 | 65.1 | 30.7 | 12.7 | 2.03 | .06 |
| Incident | 47.3 | 28.5 | 60.3 | 34.9 | 17 | -.88 | .39 |
| Conseq. | 36.2 | 34.7 | 52.5 | 37.3 | 17 | -.98 | .34 |
| **IC** | | | | | | | |
| Scene | 57.8 | 27.3 | 40.9 | 29.4 | 17 | 1.3 | .21 |
| Approach | 63.7 | 37.4 | 78.8 | 18.5 | 11.4 | -1.1 | .29 |
| Incident | 85.1 | 10.1 | 83.7 | 27.9 | 17 | .14 | .88 |
| Conseq. | 57.3 | 31.2 | 77.0 | 19.8 | 17 | -1.73 | .10 |
| **Neutral** | | | | | | | |
| Scene | 15.0 | 14.0 | 16.8 | 14.7 | 17 | -.27 | .79 |
| Approach | 11.4 | 7.8 | 11.5 | 18.1 | 17 | -.01 | .99 |
| Incident | 8.6 | 7.4 | 5.4 | 5.6 | 17 | 1.06 | .31 |
| Conseq. | 7.0 | 6.6 | 5.0 | 6.2 | 17 | .68 | .50 |

## Appendix G

### Psychological responses to VASs items
### Group x Script x Stage means and standard deviations

Table 9
*Mean scores and standard deviations for the Anxiety, Anger and Unhappiness measures for each stage of each script for the BPD and NBPD groups*

| | Scene | | Approach | | Incident | | Consequence | |
|---|---|---|---|---|---|---|---|---|
| VAS Items | M | SD | M | SD | M | SD | M | SD |
| **Anxiety** | | | | | | | | |
| *NSSI* | | | | | | | | |
| BPD | 71.9 | 26.6 | 73.1 | 22.8 | 58.8 | 37.0 | 59.1 | 28.5 |
| NBPD | 62.7 | 33.9 | 67.7 | 31.5 | 60.2 | 31.0 | 55.3 | 37.3 |
| *IC* | | | | | | | | |
| BPD | 51.9 | 31.4 | 70.4 | 27.1 | 72.8 | 31.2 | 73.3 | 31.5 |
| NBPD | 35.6 | 32.4 | 71.1 | 22.1 | 77.7 | 29.0 | 62.9 | 37.0 |
| *Neutral* | | | | | | | | |
| BPD | 18.4 | 16.5 | 11.7 | 9.1 | 9.6 | 6.3 | 7.7 | 5.7 |
| NBPD | 14.2 | 11.5 | 12.8 | 17.2 | 6.0 | 6.3 | 5.5 | 5.3 |
| **Anger** | | | | | | | | |
| *NSSI* | | | | | | | | |
| BPD | 52.9 | 31.0 | 62.4 | 34.0 | 47.4 | 29.3 | 34.4 | 32.8 |
| NBPD | 48.3 | 34.8 | 48.8 | 36.0 | 37.4 | 31.4 | 34.7 | 28.3 |
| *IC* | | | | | | | | |
| BPD | 46.4 | 29.7 | 68.0 | 38.7 | 82.0 | 19.8 | 48.9 | 33.0 |
| NBPD | 47.9 | 37.0 | 81.1 | 16.8 | 84.4 | 14.9 | 63.0 | 29.3 |
| *Neutral* | | | | | | | | |
| BPD | 6.4 | 5.7 | 7.1 | 7.0 | 6.4 | 6.1 | 5.2 | 5.5 |
| NBPD | 8.4 | 10.5 | 9.6 | 11.8 | 5.2 | 6.4 | 4.4 | 4.2 |
| **Unhappiness** | | | | | | | | |
| *NSSI* | | | | | | | | |
| BPD | 77.9 | 28.6 | 87.6 | 15.1 | 71.9 | 24.4 | 68.6 | 26.4 |
| NBPD | 62.3 | 33.0 | 84.0 | 17.9 | 69.0 | 34.5 | 69.0 | 29.2 |
| *IC* | | | | | | | | |
| BPD | 47.0 | 35.0 | 72.1 | 30.1 | 72.4 | 30.2 | 62.3 | 36.8 |
| NBPD | 62.1 | 33.6 | 84.9 | 14.4 | 86.7 | 27.9 | 83.7 | 24.1 |
| *Neutral* | | | | | | | | |
| BPD | 26.4 | 19.9 | 22.0 | 18.6 | 17.3 | 16.1 | 14.2 | 14.8 |
| NBPD | 24.8 | 26.2 | 17.4 | 21.5 | 14.4 | 18.9 | 6.3 | 6.9 |

Table 10
*Mean scores and standard deviations for the Agitation, Calm and Relief measures for each stage of each script for the BPD and NBPD groups*

| VAS Items | Scene | | Approach | | Incident | | Consequence | |
|---|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | M | SD | M | SD |
| **Agitation** | | | | | | | | |
| *NSSI* | | | | | | | | |
| BPD | 62.1 | 36.5 | 78.6 | 15.1 | 46.7 | 33.7 | 47.9 | 34.9 |
| NBPD | 48.4 | 29.0 | 58.5 | 32.9 | 38.1 | 32.8 | 39.5 | 35.5 |
| *IC* | | | | | | | | |
| BPD | 62.8 | 34.3 | 77.9 | 28.1 | 79.3 | 21.9 | 62.0 | 36.9 |
| NBPD | 52.1 | 35.2 | 85.7 | 11.9 | 83.5 | 13.1 | 75.0 | 20.9 |
| *Neutral* | | | | | | | | |
| BPD | 16.6 | 14.9 | 9.4 | 10.6 | 8.8 | 7.7 | 16.9 | 36.4 |
| NBPD | 15.4 | 17.4 | 14.2 | 16.9 | 14.9 | 21.8 | 3.7 | 4.3 |
| **Calm** | | | | | | | | |
| *NSSI* | | | | | | | | |
| BPD | 80.0 | 26.6 | 77.1 | 21.6 | 42.4 | 29.8 | 41.1 | 34.6 |
| NBPD | 62.2 | 27.0 | 61.0 | 29.3 | 41.0 | 35.6 | 45.8 | 34.6 |
| *IC* | | | | | | | | |
| BPD | 53.4 | 31.9 | 75.1 | 32.6 | 76.6 | 33.5 | 57.8 | 30.6 |
| NBPD | 39.7 | 34.3 | 80.7 | 11.8 | 90.1 | 7.7 | 67.7 | 30.8 |
| *Neutral* | | | | | | | | |
| BPD | 12.8 | 11.2 | 8.8 | 8.1 | 6.4 | 6.0 | 6.4 | 6.4 |
| NBPD | 9.6 | 6.6 | 8.4 | 8.7 | 6.9 | 7.4 | 3.5 | 3.1 |
| **Relief** | | | | | | | | |
| *NSSI* | | | | | | | | |
| BPD | 85.2 | 16.6 | 79.8 | 18.0 | 35.0 | 36.3 | 38.2 | 34.3 |
| NBPD | 82.1 | 16.3 | 65.9 | 37.6 | 36.3 | 35.6 | 38.4 | 37.0 |
| *IC* | | | | | | | | |
| BPD | 65.0 | 34.5 | 74.6 | 33.2 | 63.7 | 39.4 | 58.1 | 38.9 |
| NBPD | 75.4 | 22.0 | 84.5 | 15.0 | 91.0 | 8.5 | 70.2 | 24.8 |
| *Neutral* | | | | | | | | |
| BPD | 20.0 | 15.1 | 17.22 | 16.0 | 15.4 | 12.7 | 14.7 | 15.3 |
| NBPD | 31.1 | 19.0 | 27.8 | 18.2 | 21.4 | 20.0 | 12.8 | 16.2 |

Table 11
*Mean scores and standard deviations for the Pleasure, Excitement, Arousal and Bordeom measures for each stage of each script for the BPD and NBPD groups*

| VAS Items | Scene | | Approach | | Incident | | Consequence | |
|---|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | M | SD | M | SD |
| **Pleasure** | | | | | | | | |
| *NSSI* | | | | | | | | |
| BPD | 82.6 | 25.8 | 85.0 | 15.2 | 53.6 | 34.1 | 54.4 | 34.9 |
| NBPD | 83.8 | 12.8 | 63.8 | 35.8 | 51.4 | 32.8 | 64.8 | 30.4 |
| *IC* | | | | | | | | |
| BPD | 63.6 | 36.6 | 78.7 | 31.2 | 68.1 | 37.7 | 76.6 | 32.3 |
| NBPD | 69.1 | 29.5 | 90.2 | 9.1 | 93.2 | 7.5 | 88.4 | 18.5 |
| *Neutral* | | | | | | | | |
| BPD | 30.3 | 17.7 | 26.0 | 19.5 | 20.2 | 19.6 | 16.8 | 18.2 |
| NBPD | 26.0 | 26.8 | 14.1 | 12.5 | 8.7 | 9.5 | 6.3 | 6.0 |
| **Excitement** | | | | | | | | |
| *NSSI* | | | | | | | | |
| BPD | 83.3 | 20.3 | 74.7 | 23.2 | 60.0 | 30.7 | 73.4 | 25.1 |
| NBPD | 72.7 | 24.7 | 52.1 | 34.9 | 66.3 | 27.7 | 70.9 | 29.9 |
| *IC* | | | | | | | | |
| BPD | 63.1 | 36.4 | 66.4 | 30.1 | 67.6 | 29.3 | 68.4 | 27.1 |
| NBPD | 86.3 | 18.6 | 75.0 | 25.0 | 81.4 | 22.5 | 79.8 | 25.1 |
| *Neutral* | | | | | | | | |
| BPD | 43.9 | 29.5 | 41.6 | 26.9 | 49.9 | 34.9 | 54.2 | 33.5 |
| NBPD | 55.7 | 30.7 | 50.4 | 29.8 | 40.3 | 35.0 | 43.7 | 30.7 |
| **Arousal** | | | | | | | | |
| *NSSI* | | | | | | | | |
| BPD | 67.9 | 34.2 | 58.2 | 38.0 | 67.2 | 40.4 | 72.7 | 32.2 |
| NBPD | 73.2 | 21.1 | 57.9 | 28.3 | 64.0 | 25.1 | 73.4 | 24.1 |
| *IC* | | | | | | | | |
| BPD | 61.8 | 35.6 | 61.4 | 36.2 | 61.9 | 36.3 | 68.9 | 31.6 |
| NBPD | 64.3 | 28.7 | 73.6 | 23.0 | 62.9 | 32.2 | 66.2 | 29.5 |
| *Neutral* | | | | | | | | |
| BPD | 78.6 | 23.7 | 76.8 | 27.4 | 74.3 | 29.8 | 75.9 | 30.0 |
| NBPD | 77.6 | 24.9 | 74.2 | 31.4 | 71.8 | 31.6 | 66.1 | 34.5 |
| **Boredom** | | | | | | | | |
| *NSSI* | | | | | | | | |
| BPD | 25.4 | 22.8 | 16.6 | 13.5 | 18.2 | 20.7 | 21.7 | 20.0 |
| NBPD | 41.5 | 36.1 | 30.4 | 25 | 22.2 | 21.3 | 27.1 | 23.5 |
| *IC* | | | | | | | | |
| BPD | 34.8 | 25.3 | 25.3 | 21.4 | 21.8 | 24.8 | 15.1 | 13.4 |
| NBPD | 28.9 | 26.5 | 24.4 | 30.1 | 22.4 | 28.7 | 27.1 | 24.5 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Neutral* | | | | | | | | |
| BPD | 26.8 | 25.5 | 24.8 | 22.1 | 29.1 | 18.1 | 26.2 | 19.7 |
| NBPD | 30.1 | 23.8 | 24.2 | 23.3 | 21.6 | 21.3 | 11.9 | 11.8 |

## Appendix H

### Image clarity and image accuracy means and standard deviations

Table 12
*Means scores and standard deviations for image clarity of script content for each stage of each script*

| | Scene | | Approach | | Incident | | Consequence | |
|---|---|---|---|---|---|---|---|---|
| Script | M | SD | M | SD | M | SD | M | SD |
| NSSI | 84.6 | 11.8 | 88.7 | 8.3 | 90.0 | 7.7 | 87.4 | 10.4 |
| IC | 76.0 | 14.9 | 79.4 | 15.2 | 85.2 | 13.0 | 83.2 | 11.2 |
| Neutral | 83.4 | 16.0 | 88.8 | 12.8 | 89.4 | 11.1 | 90.4 | 9.2 |

Table 13
*Means scores and standard deviations for image accuracy of script content for each stage of each script*

| | Scene | | Approach | | Incident | | Consequence | |
|---|---|---|---|---|---|---|---|---|
| Script | M | SD | M | SD | M | SD | M | SD |
| NSSI | 89.4 | 7.5 | 88.8 | 9.6 | 89.3 | 8.2 | 86.7 | 12.7 |
| IC | 77.8 | 18.8 | 83 | 15.1 | 85.8 | 12.9 | 88.7 | 9.2 |
| Neutral | 87.7 | 9.9 | 89.7 | 9.3 | 90.2 | 8.4 | 88.7 | 10.3 |